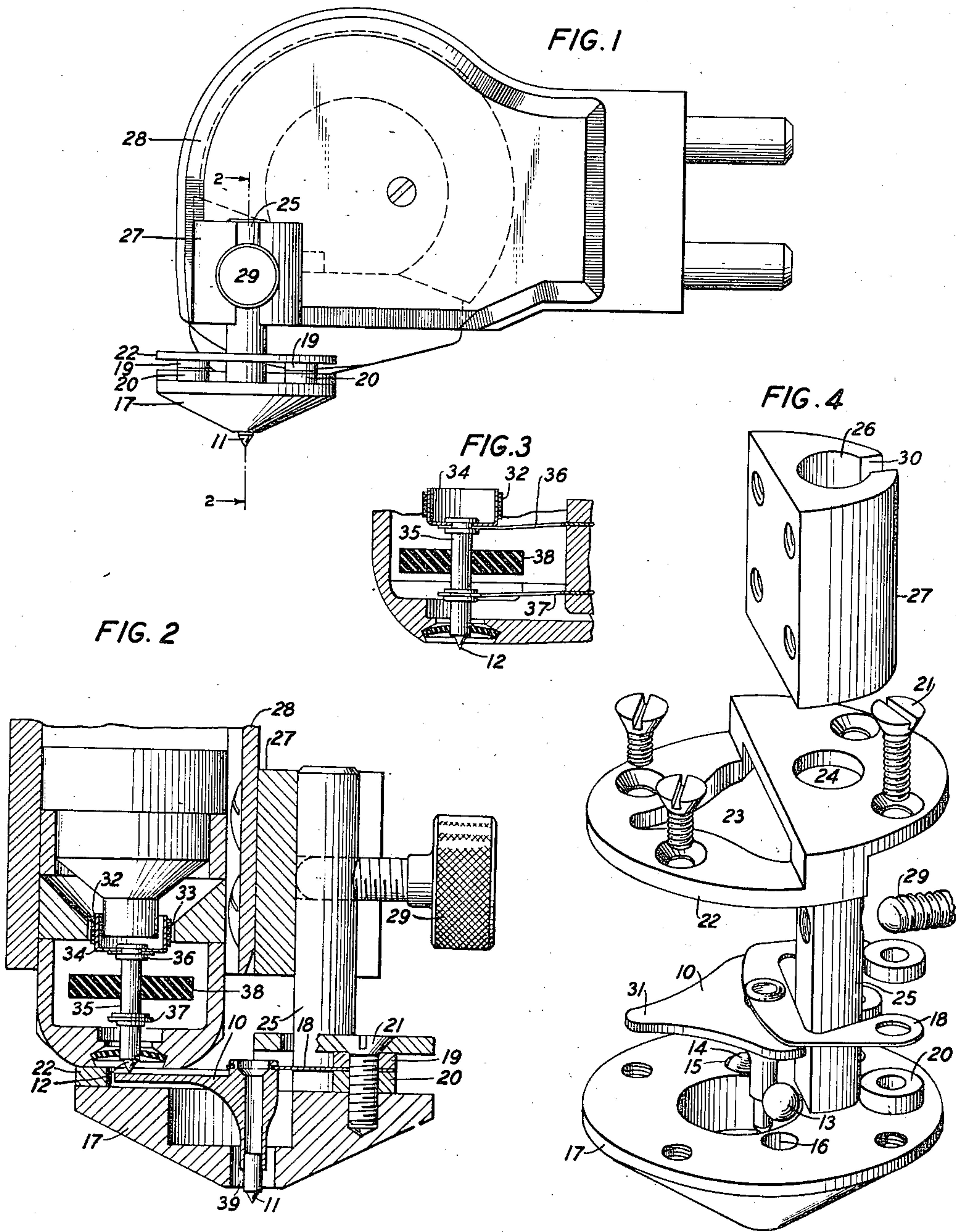


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PHONOGRAPH REPRODUCER

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PHONOGRAPH REPRODUCER

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This invention relates to phonograph reproducers for hill-and-dale type records and the object of the invention is an attachment for such reproducers for adapting them for use on lateral type records.

The high quality reproduction now obtainable from hill-and-dale type records is due in part to the superior tracking ability of modern hill-and-dale reproducers as compared with lateral reproducers on lateral type records. Lateral type records are widely used, however, and it is often advantageous to play such records with a hill-and-dale type reproducer fitted with a suitable converting attachment.

In the preferred embodiment of the attachment of this invention a lateral stylus is mounted in one end of an L-shaped member which is pivotally supported at the junction of the arms on a suitable pivot by a cantilever spring. The housing of the device is fitted with a stud which slides into a socket provided for the purpose on the reproducer with which it is to be used. The socket is preferably slotted to receive a set screw in the stud which aligns the attachment and the reproducer with the tip of the horizontal arm of the L-shaped member engaging the stylus of the reproducer. The position of the member and the stiffness of its supporting spring are such that when the housing is locked in position against the bottom plate of the reproducer, the reproducer moving system is deflected into the same operating position as it occupies when placed directly on a record.

When the attachment is used with a reproducer of the type disclosed in a copending application of A. C. Keller, Serial No. 402,128, filed October 24, 1929, now Patent No. 1,981,793, granted November 20, 1934, the lateral reproduction compares very favorably with that of the best lateral reproducers in both frequency range and efficiency and good tracking is obtained with stylus pressures of less than thirty grams. These and other features of the invention will be more clearly understood from the following detailed description and the accompanying drawing in which:

Fig. 1 is a side view of the attachment secured in operative position to a hill-and-dale reproducer;

Fig. 2 is a sectional view of the attachment and the vibrating system of the reproducer;

Fig. 3 is a sectional view longitudinally of the reproducer vibrating system; and

Fig. 4 is an exploded view of the attachment.

Referring now to the drawing, it will be seen

that in the attachment illustrated the vibratory system comprises an inverted L-shaped arm 10 fitted with a stylus 11 for engaging a lateral cut in the record, the other end of the arm being in contact with the stylus 12 of the hill-and-dale reproducer with which it has to be used. The arm is supported in this position on steel balls 13 and 14 press fitted into holes 15 and 16 in the bottom piece 17 by the U-shaped spring 18, the arms of which are clamped between the washers 19 and 20 by the screws 21 in the top plate 22. This top plate has an opening 23 to provide vibrating clearance for the arm 10 and a hole 24 through which the stud 25 extends upwardly to support the attachment in operative position by engagement with the hole 26 in the block 27 which is secured to the casing 28 of the reproducer. The stud is fitted with a set screw 29 which slides in the slot 30 in the block 27 to align the tip 31 of the arm 10 with the reproducer stylus and hold the attachment in this position. The thickness of the top plate and the stiffness of the spring 18 are so proportioned that when the attachment is in place and the stylus 11 is resting on a record, the moving system of the reproducer is in its proper operating position. The moving system of the reproducer illustrated comprises, a coil 32 supported in the air-gap 33 by a cup member 34 connected to the reproducer stylus 12 by a tube 35. This system is resiliently supported by spaced parallel cantilever springs 36 and 37 and the vibrations of the system are suitably damped by a disc 38 of highly dissipative rubber surrounding the tube 35, but free of its periphery to flex when subjected to vibratory forces. While the attachment illustrated is particularly designed for use with a reproducer of this type it will be obvious that it can be adapted readily for use with hill-and-dale reproducers of other types.

When the stylus 11 is driven by a lateral record the spring 18 flexes and the arm 10 pivots on the balls 13 and 14 so that the tip 31 of the arm moves in a substantially vertical direction to drive the coil 32 in the same way as it is driven when the stylus 12 is contacting a hill-and-dale record. While the motion of the tip 31 of the arm 10 is along the arc of a circle rather than along a straight vertical line the stylus 12 is free to slide along the arm 10 so that the vibratory system is not subjected to unnecessary strain. By properly proportioning the mass of the arm 10 and the stiffness of the spring 18 with respect to the moving system of the reproducer as taught in the Keller patent positive contact will be main-

tained between the arm and the reproducer stylus and the coil will generate currents to reproduce faithfully high quality lateral cut records.

The stylus 11 projects only very slightly below the bottom piece 17 so that if the device is accidentally dropped on a record the spring 18 deflects permitting the arm 10 to move upwardly out of contact with the balls 13 and 14 so that the stylus recedes into the opening 39. In this way the shock is absorbed by the plate 17 and no damage results to the moving system of the attachment or of the reproducer.

What is claimed is:

1. A lateral reproducing attachment for hill-and-dale phonograph reproducers comprising a housing, means for securing the housing to a reproducer, an L-shaped member in the housing having a laterally vibratable stylus at one end, and resilient means for holding the other end of the member in contact with the stylus of the reproducer.

2. In a lateral reproducing attachment for hill-and-dale phonograph reproducers, a member having vertical and horizontal arms, a stylus in the vertical arm, a housing, a laterally rigid cantilever spring supporting the member in the housing at the junction of the arms, and means for holding the horizontal arm of the member in contact with the stylus of a reproducer.

3. A lateral reproducing attachment for hill-and-dale phonograph reproducers comprising a housing, means for attaching the housing to a reproducer, a vibratable member having horizontal and vertical arms, a stylus in the vertical arm, means in the housing for pivotally supporting the member at the junction of the arms, means for aligning the attachment with the reproducer to bring the horizontal arm in contact with the stylus of the reproducer, and means for limiting the deflection of the moving system of the reproducer by the horizontal arm to the deflection produced when the reproducer stylus is in contact with a record.

4. The combination with a hill-and-dale phonograph reproducer having a stationary structure and a resiliently mounted moving system including a stylus, of a lateral reproducing attachment for the reproducer comprising a pivoted member, a laterally vibratable stylus for driving the member, means for securing the attachment to the reproducer with the member in contact with the reproducer stylus, and a stop member on the attachment engaging the stationary structure for limiting the static deflection of the moving system of the reproducer by the

member to the normal deflection produced when the reproducer stylus is placed on a record.

5. A lateral reproducing attachment for hill-and-dale phonograph reproducers comprising a member having a horizontal arm for driving the reproducer stylus and a vertical arm for receiving a laterally vibratable stylus, a resilient support for the member at the junction of the arms, and means for securing the attachment to a reproducer, the resiliency and the location of the support being correlated to the constants of the moving system of the reproducer so that when the lateral stylus is contacting a record the moving system of the reproducer is deflected to substantially the same position as when the reproducer stylus is placed directly on a record.

6. The combination with a reproducer having a vertically vibratable stylus and a slotted receptacle on the reproducer, of a reproducing attachment comprising a housing, an L-shaped arm pivoted therein, a laterally vibratable stylus on the arm and a stud on the housing engaging the receptacle, of means in the stud aligning the arm with the stylus of the reproducer, and a stop member on the housing engaging the reproducer for limiting the displacement of the reproducer stylus when the attachment is secured to the reproducer.

7. In a lateral reproducing attachment for hill-and-dale phonograph reproducers, the combination with an L-shaped arm having a laterally vibratable stylus at one end and a housing, of a plurality of curved supporting surfaces for the arm in the housing, and resilient means for holding the arm on said surfaces and in sliding contact with the stylus of a hill-and-dale reproducer.

8. In a lateral reproducing attachment for hill-and-dale phonograph reproducers, the combination with an L-shaped arm having a laterally vibratable stylus at one end and a housing, of a plurality of balls in the housing forming a pivot bearing for the arm, and a U-shaped cantilever spring for supporting the arm on the balls and holding the arm in contact with the stylus of a hill-and-dale reproducer.

9. In a lateral reproducing attachment for hill-and-dale phonograph reproducers, the combination with an L-shaped arm having a laterally vibratable stylus at one end, of a housing for and a spring within the housing holding the arm in contact with the stylus of a reproducer, said spring being vertically deflectable to permit the stylus to recede into the housing when subjected to abnormal forces.

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