Oct. 29, 1929. A. C. KELLER 1,733,607

COMBINED RECORDER AND REPRODUCER

Filed June 30, 1928

FIG. 1.

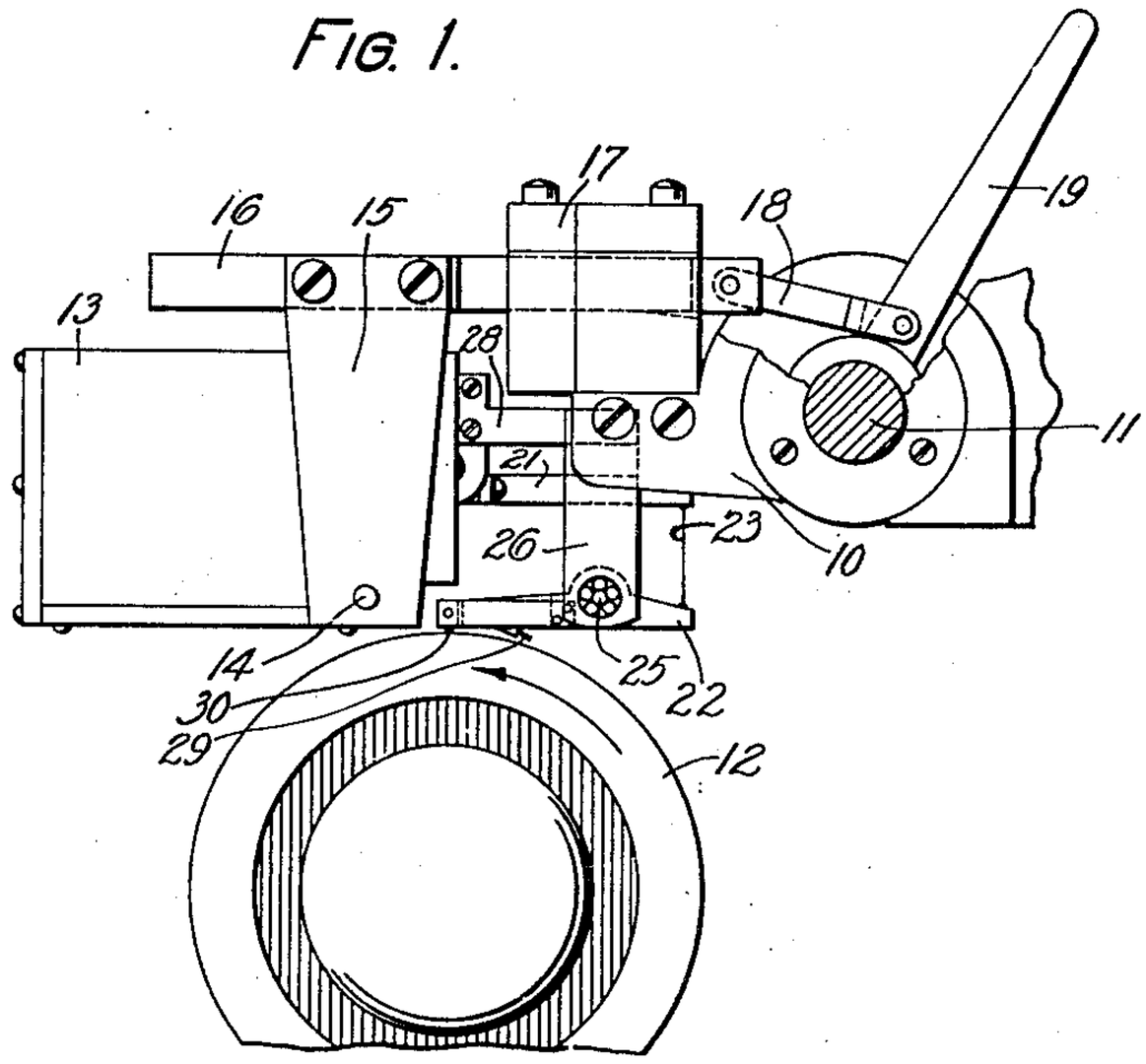


FIG. 2.

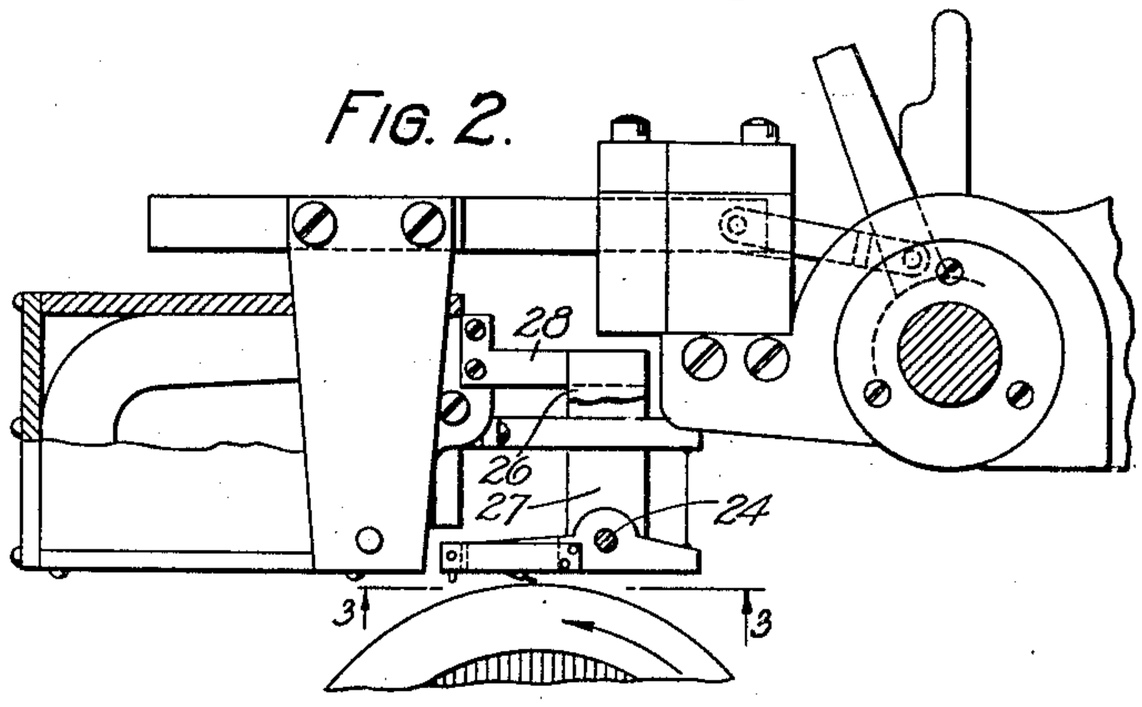
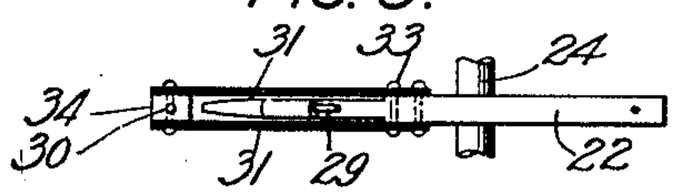


FIG. 3.



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Patented Oct. 29, 1929 1,733,607

UNITED STATES PATENT OFFICE

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COMBINED RECORDER AND REPRODUCER

Application filed June 30, 1928. Serial No. 289,515.

This invention relates in general to phonographs and more particularly to such devices equipped for both recording and reproduction of sound waves with a single instrument.

In phonograph devices arranged for the recording and reproduction of sound waves, it has long been appreciated that any lateral movement of a recording stylus should be prevented in order that a faithful reproduction of the sound waves might be recorded on a record. On the other hand a certain amount of lateral movement should be permitted the reproducing stylus in order that it may accurately follow the groove of the record to faithfully reproduce the sound waves without causing undue wear on the record. Various arrangements have been proposed to meet these requirements but the resulting structures were, in general, inefficient and so complicated as to cause difficulty in maintaining the apparatus in proper adjustment. It is, therefore, an object of the present invention to provide an improved structure in which the reproducing stylus is allowed a certain amount of lateral motion while the recording stylus is prevented from any lateral movement and, furthermore, a structure which is efficient and easily maintained in adjustment.

To accomplish this object and in accordance with a feature of the invention, the recording stylus of a combined recorder and reproducer is rigidly secured to a pivotally mounted stylus arm to insure its vibration in one plane only and the reproducing stylus is flexibly mounted to the stylus arm in such a manner that it is free to move in a plane perpendicular to the plane of movement of the recording stylus. In a preferred embodiment this is accomplished by securing the reproducing stylus to the stylus arm by means of one or more thin metallic strips which are free to vibrate in a plane perpendicular to the plane of movement of the recording stylus but which are substantially restrained from movement in the same plane.

These and other objects of the invention may be more clearly understood by reference to the accompanying drawing in which:

Fig. 1 is a view of a device embodying the features of the invention and arranged for reproducing;

Fig. 2 is a view partly in section of the device of Fig. 1 in the position for recording; and

Fig. 3 is an enlarged view of the stylus arm showing its details of construction.

Referring to the drawings the carriage 10 is arranged to move slowly along the rod 11 in the well-known manner as the recording or reproducing stylus traces a helix on the periphery of the record 12, which is rotated at a suitable speed in the direction shown by the arrow. An electrical operating unit, which is preferably of the general type disclosed in the copending application of Henry C. Harrison, Serial No. 191,012, filed May 13, 1927, is enclosed in casing 13 which is pivotally mounted at 14 to the bracket members 15, which in turn, are rigidly secured to plate 16. This plate is arranged to slide freely through guide member 17 and is connected by means of link 18 to the operating lever 19. Rigidly secured to the armature of the electrical operating unit is an extension member 21 which, in turn, is secured to the stylus arm 22 by means of a substantially rigid rod 23. The stylus arm 22 is provided with a shaft member 24 which rotates in suitable bearing members 25 positioned in the side brackets 26, 27 of supporting members 28 which, in turn, is rigidly secured to the casing 13 of the electrical unit. The stylus arm 22 is provided near its end with a recording stylus 29 which is rigidly secured thereto. A reproducing stylus 30, as will be more clearly seen by reference to Fig. 3, is flexibly secured to the stylus arm by means of flexible strips 31, 31, these strips being preferably secured to the stylus arm by means of rivets 33, 33. The reproducing stylus 30 is secured in the mounting 34 which is riveted to the outer ends of the flexible strips 31, 31. While it is preferable to employ a plurality of strips 31 as shown, it is obvious that satisfactory results may be obtained by mounting the reproducing stylus at the end of a single flexible strip.

With the device arranged for reproducing, as shown in Fig. 1, the reproducing stylus is

in engagement with the record 12 and is allowed lateral movement due to the flexure of the strips 31, 31. When in the recording position shown by Fig. 2 the recording stylus is in engagement with the record 12, but since the stylus is rigidly secured to stylus arm 22, it is not permitted any lateral movement. With the arrangement shown, due to the manner in which the device is pivoted and the relative positions of the recording and reproducing styli, the force exerted upon the record when the device is used for reproducing is greater than that exerted when it is used for recording purposes. Furthermore, since the relative positions of the stylus arm and the electrical unit are the same irrespective of whether the device is being used for recording or for reproducing, the driving rod 23, which is positioned perpendicular to the extension member 21, provides a driving arrangement of maximum efficiency in either case.

What is claimed is:

1. In a sound recording and reproducing device, a stylus arm, a recording stylus rigidly mounted thereon, a reproducing stylus, and flexible means for joining the reproducing stylus to the stylus arm.

2. In a sound recording and reproducing device, a stylus arm arranged to vibrate in one plane only, a recording stylus rigidly secured thereto, and a reproducing stylus flexibly secured to said arm and adapted to vibrate in a plane perpendicular to the plane of vibration of said arm.

3. In a sound recording and reproducing device, a stylus arm arranged to vibrate in one plane only, a recording stylus rigidly secured thereto, a flexible member secured to said stylus arm and adapted to flex in a plane perpendicular to the plane of vibration of said stylus arm, and a reproducing stylus mounted at the outer end of said flexible member.

4. In a sound recording and reproducing device, a stylus arm, a recording stylus rigidly secured thereto, a reproducing stylus, and a plurality of flexible members for securing the reproducing stylus to the stylus arm.

5. In a sound recording and reproducing device a stylus arm arranged to vibrate in one plane only, a recording stylus rigidly secured to the end of said stylus arm, a plurality of flexible members fastened at one end to the stylus arm, a supporting member rigidly secured to the opposite end of said flexible members, and a reproducing stylus mounted in said supporting member whereby said reproducing stylus is free to vibrate in a plane perpendicular to the plane of vibration of said stylus arm.

In witness whereof, I hereunto subscribe my name this 29th day of June, 1928.

ARTHUR C. KELLER.