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DUAL NEEDLE PHONOGRAPH PICK-UP

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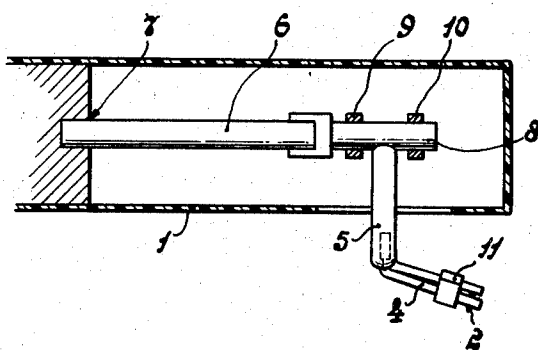


Fig. 1

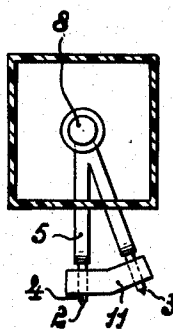


Fig. 2

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DUAL NEEDLE PHONOGRAPH PICK-UP

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2 Claims. (Cl. 179-100.41)

The invention relates to pick-ups comprising at least two tracking needles, for example for use with normal and micro-groove disc records, which can be alternately rendered operative or inoperative and are each secured to a resilient needle holder, the said needle holders being connected via an armature to a common transforming element, while undesired movements of the needle holders are externally damped. It has been found that a needle holder which is inoperative during operation of the pick-up and consequently is connected to the entire system as a member supported at one end may be set into resonance due to the fact that its natural frequency is attained. Owing to the fact that at this frequency energy is absorbed a comparatively sharp fall in the frequency characteristic curve of the pick-up will result, which is detrimental to faithful reproduction of the vibrations required to be tracked by the pick-up. In order to avoid this phenomenon for the greater part it is already known to provide the resilient needle holder with external damping by connecting the needle holder to the pick-up housing via a member made of damping material with the result that the amplitudes of any resonance vibrations which may occur are greatly reduced. Since the inoperative needle holders have to be damped in such a manner in all the playing positions of the pick-up, the operative needle holder will also be provided with such a member. The provision of a damping member results in the introduction of an additional rigidity of the needle holder with respect to the systems. The rigidity of the needle holder with respect to the pick-up housing determines the force necessarily required to be exerted sideways on the needle in order to obtain a predetermined deflection of the needle. When playing a record this force must be kept within certain limits since when this limit is exceeded the needle tends to leave the groove along one of its walls under the action of the said force. This will be counteracted by the weight of the pick-up by which the needle is urged against one wall or both walls of the groove. Owing to the introduction of a greater rigidity by the provision in known manner of a damping member between the needle holder and the pick-up an equal deflection of the needle will require a greater force which, if the pick-up is likely to be forced from the groove, will have to be compensated for by a greater weight of the pick-up which again results in greater wear of the needles and the disc records.

According to the invention, in order to avoid this disadvantage, in a pick-up the resilient needle holders are intercoupled by means of a member consisting entirely or in part of damping material. According to the invention it has been found that in the case of a crystal pick-up, with which the invention is preferably used, the total rigidity of the needle with respect to the pick-up

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housing substantially consists of the sum of the rigidities of the resilient needle holder, of the armature and of the crystal about its torsion axis. Since the first-mentioned two rigidities are great compared with the last-mentioned rigidity, as is required for satisfactory operation of the pick-up, the introduction of the new rigidity of the damping member will not result in a material increase in the total rigidity, since the greatest rigidity only is increased by the parallel connection of the rigidity of the damping material, whereas the smallest rigidity by which the obtained amplitude is substantially determined remains constant. Consequently the force required to cause a predetermined lateral deflection of the needle will also remain substantially constant in spite of the provision of the damping material while the above described resonance phenomenon will no longer exert a detrimental influence.

A satisfactory structural solution is obtained by securing the member consisting of damping material to the resilient needle holders adjacent the needles.

The invention will now be described more fully with reference to one embodiment thereof.

Fig. 1 is a cross-sectional view of a crystal pick-up in accordance with the invention, while

Fig. 2 is a front elevation thereof in which the front face of the pick-up housing has been omitted.

Referring now to the figures, reference numeral 1 designates the housing of a crystal pick-up comprising two tracking needles 2 and 3 the first of which is operative while the latter is inoperative. Both needles, for example sapphires, are secured to resilient needle holders, for example the tracking needle 2 to the needle holder 4. The needle holder is in turn connected via an armature 5 to a common crystal 6. This crystal is gripped in the housing 1 at 7 and can be twisted by the armature 5 about the axis 8 journaled in the housing at 9 and 10. The rigidity of the entire pick-up system consists of the torsional rigidity of the crystal about the axis 8 and of the rigidities of the armature 5 and the needle holder, the two last-mentioned rigidities materially exceeding the first-mentioned rigidity. According to the invention the two resilient needle holders are intercoupled by means of a damping member 11 arranged adjacent the needles 2 and 3. The rigidity produced by the damping member 11 is parallel only to the larger rigidities of the resilient needle holders so that the smallest rigidity about the torsion axis 8 remains constant whereas any resonance of the free needle 3 is counteracted by the damping material.

What is claimed is:

1. A phonograph pick-up comprising at least two selectively operative and spaced tracking needles, a resilient needle holder for each tracking needle, a common transducer, a V-shaped armature connecting both needle holders to said common transducer, and means for externally damping undesired resonance vibrations of said needle holders including an element constituted of damping material directly intercoupling said resilient needle holders.

2. A phonograph pick-up as set forth in claim 1 wherein said element constituted of damping material is secured to said needle holders at places adjacent to each respective needle.

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