Sept. 26, 1961 H. BATSCH ET AL 3,002,056

TONE ARM ASSEMBLY

Filed May 28, 1959

Fig. 1

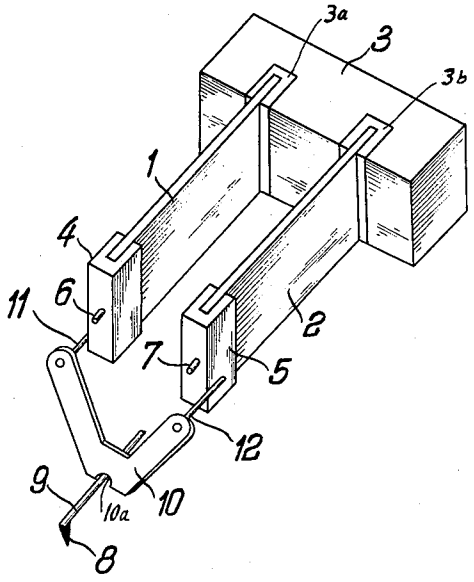


Fig. 2

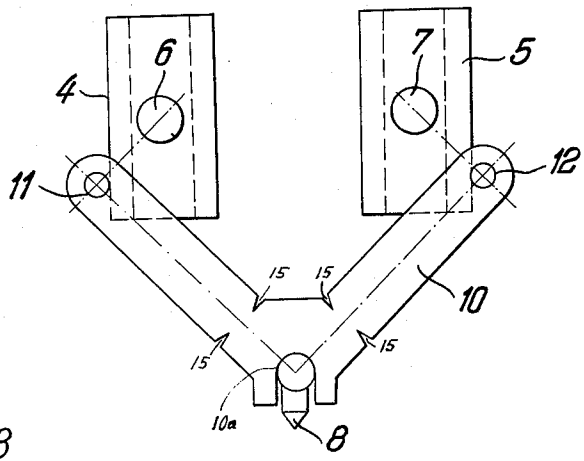
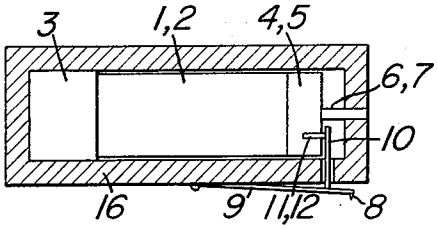


Fig. 3



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TONE ARM ASSEMBLY

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4 Claims. (Cl. 179—100.41)

The present invention relates to a two-crystal tone arm assembly for tracking a record having two sound channels in the same groove comprising a stereophonic recording in two oscillating directions which are symmetrically oriented with respect to one another by 90°. In this case the two oscillating directions are each displaced 45° with respect to the plane of the record disc and with respect to the axis of the needle. It is the purpose of the present invention to provide a reliable and foolproof operating tone arm assembly which at the same time is compact.

A crystal tone arm for stereophonic record discs has been known in which the two channels are recorded in the same groove as lateral and depth cut tracks. (See printed German patent application T 11,092, Class 42g, Group 5/02.) According to said published patent application the needle is connected with the two crystals via a V-shaped coupling member of resilient synthetic material, the dimensions of which are different in the two mutually perpendicular directions which correspond to the recording directions. As a result of this, the resiliency in the direction of advance of the needle in the groove is substantially less than in the other direction which is normal to the first direction. The V-shaped coupling member is made of a single piece of synthetic material. In the disclosure of the mentioned German patent application the V-shaped coupling member and two clamps for the crystals likewise of synthetic material are made of a single piece.

In this known tone arm assembly the large surfaces of the two crystals are perpendicular with respect to one another. However, in case of a 45°/45° groove recording, it is desirable that the large surfaces of the crystals be parallel to one another in order to save space. In this case difficulties are encountered, because the legs of the V-shaped coupling member are applied to the crystals in such a manner that the driving forces are entirely torsional. In order to fulfill this condition it is necessary that the connecting line between the torsional axis of the crystal and the point of application of force on the crystal be perpendicular to the longitudinal axis of the associated leg of the V-shaped coupling member.

It is an object of the invention to solve this problem in a stereophonic tone arm in which two crystals are provided having their large surfaces parallel to one another, whereby the ends of the legs of the mentioned V-shaped coupling member twist the crystal by means of separate metallic cranks, each being connected to a crystal.

It is another object of the invention to provide the end of each crystal to which the metallic cranks are attached with a rotatable pivot pin lying on the torsional axis in a manner known per se in monaural crystal tone arms.

Still further objects and the entire scope of applicability of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the invention, ar given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

In the drawings:

FIG. 1 shows schematically a perspective view of the new system.

FIG. 2 illustrates schematically a front view of this system on an enlarged scale.

FIG. 3 is a sectional view of the system.

According to FIGS. 1 and 3, two crystals 1 and 2 are fixed in a block 3 in rubber inserts 3*a* and 3*b*. The block 3 forms a part of a housing 16 made of plastic, such as polystyrol. Metallic clamps 4 and 5 are secured to the free ends of the two crystals 1 and 2, respectively. These clamps 4 and 5 have pivot pins 6 and 7, respectively, which are rotatably journaled in the above-mentioned housing. The torsional axes of these crystals coincide with these pins. A needle 8 of the tone arm is secured to a resilient needle carrier 9 in a manner known per se, said needle carrier being mounted on the other end of the housing. The needle carrier 9 bears with light yieldable pressure against a recess 10*a* in the V-shaped coupling member 10 of resilient synthetic material, such as polyvinylchloride. Holes are provided in the ends of the legs of the coupling member 10, by means of which the legs of this coupling member are placed on metal pins 11 and 12 which in turn are soldered to the clamps 4 and 5. These metal pins 11 and 12 together with the clamps 4 and 5, respectively, form metallic cranks.

The connection between the needle 8 and the crystal is illustrated in front view in FIG. 2. It can be seen in this illustration that the dash-dotted center lines are symmetrically perpendicular to one another. The coupling member 10 is provided with notches 15 to increase the resiliency transversely of the vibration transmitting direction. This is desirable for improving the decoupling between the two channels.

What is claimed is:

1. A tone arm piezoelectric pickup assembly for use with groove-type stereophonic recordings having two sound channels mutually displaced by 90° transversely of the groove and the recording directions being symmetrically oriented with respect to the axis of the tone arm needle, said assembly comprising a housing; two flat-type crystals each associated with one of said channels and fixed at one end to said housing and said crystals having their larger surfaces oriented in mutually adjacent parallel relation; a clamp fixed to the other end of each crystal at right angles to a longitudinal torsional axis thereof disposed parallel to said larger surfaces; pivot means connected with each clamp and coaxial with said longitudinal torsional axis and journalled in said housing to support said other end of each crystal against all except torsional movements; a V-shaped coupling member supporting a needle at its apex and having symmetrical legs extending upwardly to points adjacent said clamps; and crank means each being coupled at one end to a clamp at a position offset from said axis and at the other end to one of said legs, whereby transverse vibration of the needle causes twisting of at least one crystal about its torsional axis.

2. In a tone arm assembly as set forth in claim 1, each crank comprising a rod fixed at one end to a clamp and disposed parallel to the torsional axis and offset therefrom, and being attached at its other end to a leg of said coupling member.

3. In a tone arm assembly as set forth in claim 2, in each leg of said coupling member, a plane including the axis of the rod and a line drawn from said apex to said rod axis, said plane being perpendicular with a line drawn from the torsional axis across the clamp to the axis of the rod.

4. In a tone arm assembly as set forth in claim 1, the legs of the coupling member being reduced in cross sec-

tional area along at least a portion of their lengths to make the legs more limber to bending without materially reducing their rigidity in thrust along a line from said apex to the intersection with the associated crank means.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 20,213 Sawyer ---------- Dec. 22, 1936
2,363,497 Begun ---------- Nov. 28, 1944
2,775,460 Shivack ---------- Dec. 25, 1956

FOREIGN PATENTS

814,015 Great Britain ---------- July 10, 1956
1,000,608 Germany ---------- Jan. 15, 1957