June 9, 1964 M. DE VRIES 3,136,555

STEREOPHONIC PICK-UP

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Fig. 1

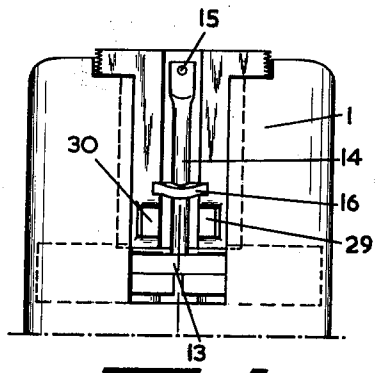



Fig. 2

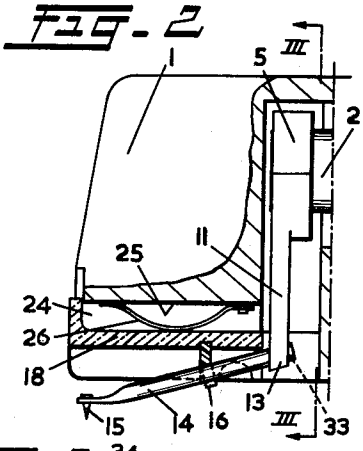



Fig. 3

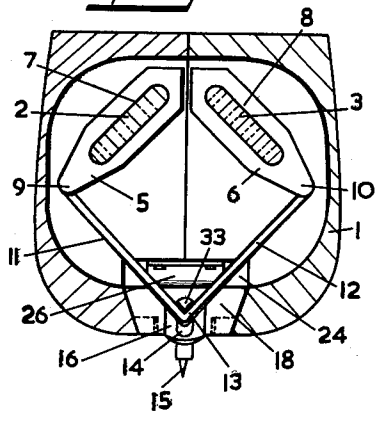



Fig. 6

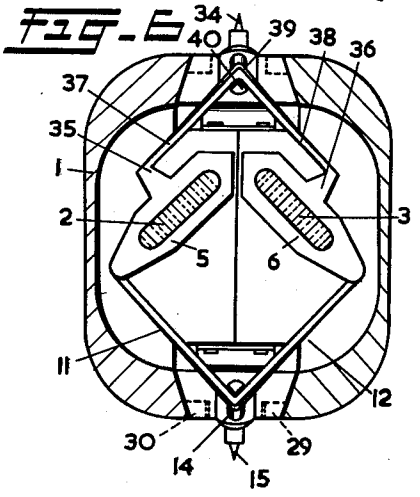



Fig. 4

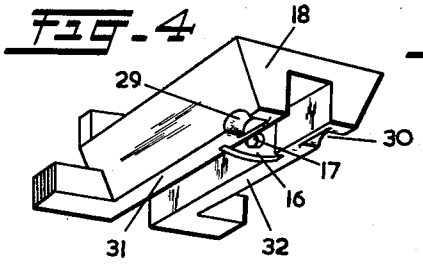
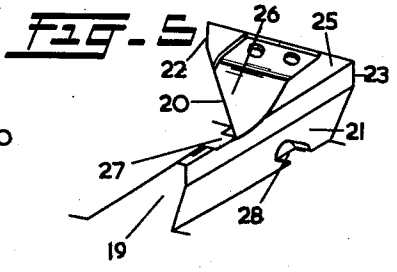



Fig. 5

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STEREOPHONIC PICK-UP

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Fig. 7

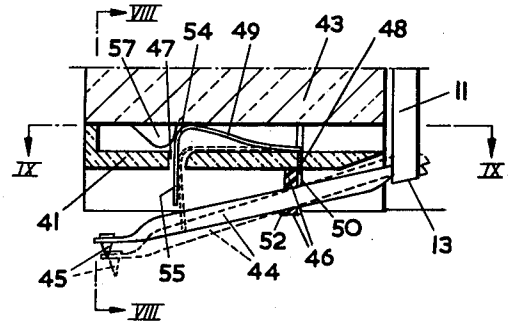



Fig. 8

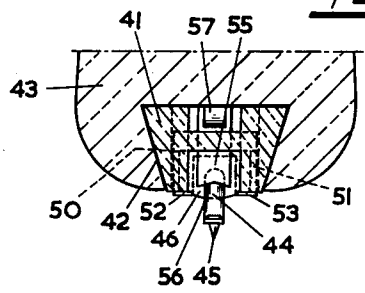
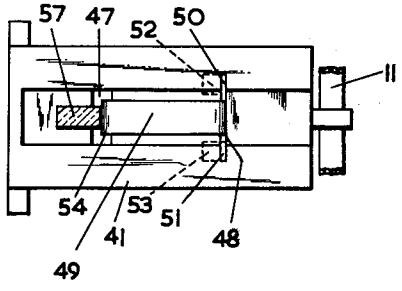



Fig. 9

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3,136,555

# STEREOPHONIC PICK-UP

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Claims priority, application Netherlands July 2, 1959
13 Claims. (Cl. 274—37)

The present invention relates to a stereophonic pick-up comprising a casing in which two transducers are secured, either transducer being connected with a common stylus holder by a coupling means, said stylus holder having a stylus fitted to its one end and having its other end accommodated within the smaller of the two angles formed by the interconnected ends of said coupling means.

If a pick-up of this type is to have a satisfactory separating capacity the coupling means should have a relatively thin elongated shape. If the coupling means have this shape they will have an adequate yieldingness in transverse direction, it is true, but the consequence thereof at the same time is that in longitudinal direction said coupling means can take up but a very slight force without collapsing. This means that the coupling means are no longer in a position then to take up the reaction force of the stylus pressure, so that in this respect special provisions are to be taken.

The object of the invention is to so construct the stylus holder that when the pick-up is placed on a record a mechanical stress will manifest itself in the coupling means which levels out the said reaction force. If desired, the construction may be so that already after the assembly of the pick-up there is a certain pre-stress in the coupling means which when the pick-up is placed on a record increases to a value capable of withstanding the reaction force.

A further object according to the invention is that during the mounting of the stylus holder in the casing, said stylus holder will lie in the correct position in respect of the coupling means without it being necessary to pay any special attention thereto.

To achieve these objects according to the invention the pick-up of the type referred to is so constructed that during its mounting the stylus holder which is secured in a support, only admits of being brought in its place along a fixed track, which track as regards its shape and location relative to the casing is defined by guide means with which such support and said casing respectively are provided, said track being so shaped and located that at least when the support covers the last portion of said track the produced part of said other end of the stylus holder is located within the angle enclosed by the coupling means, the arrangement being such that said other end of the stylus holder is positively brought in its seat on the ends of the coupling means.

In addition the pick-up according to the invention may have for its feature that the support has a predetermined seat relative to the casing, which seat can only be reached by moving the support along a fixed track in the direction towards the coupling means, said track as regards its shape and location being defined by cooperating guide means with which said support and said casing are provided respectively, the path of movement of the stylus holder being solely determined by the track of the support.

According to another feature of the invention the said guide means also comprise a resilient member biasing the support way from the casing at least as long as the support occupies its seat.

According to still another feature of the pick-up according to the invention, the support comprises a resilient member having one portion secured in the support and having another portion located in the vicinity of the stylus holder, the casing being provided with a projection adapted to cooperate with said resilient member while during said cooperation the stylus holder which is tiltably supported by the support is so moved relative to said support by said resilient member that said stylus holder moves through a positive resultant path.



The invention will be elucidated hereinafter with reference to the accompanying drawings showing some embodiments.

In said drawings:

FIGURE 1 is a partial bottom view of a first embodiment of the pick-up provided with one stylus holder;

FIGURE 2 is likewise a partial showing of the pick-up according to FIGURE 1, said showing being partly an elevation and partly a sectional view;

FIGURE 3 is a cross-sectional view on the line III—III in FIGURE 2;

FIGURE 4 shows the detachable support of the stylus holder in perspective;

FIGURE 5 shows a slot provided in the pick-up according to FIGURES 1 and 2, in which slot the support according to FIGURE 4 fits;

FIGURE 6 is a sectional view of the type as shown in FIGURE 3, but of a second embodiment which is provided with two stylus holders located diametrically opposite each other;

FIGURE 7 is a longitudinal sectional view of a support different from the support shown in the preceding figures;

FIGURE 8 is a cross-sectional view on the line VIII—VIII in FIGURE 7;

FIGURE 9 is a plan view of a support removed from the casing.

Within a casing **1** two crystal elements **2** and **3** are located the one ends of which are clamped in the casing **1** in a manner not shown. On each of the other free ends of the crystal elements **2** and **3** a sleeve **5** and **6** respectively is fitted, for which purpose said sleeves are each provided with a longitudinal slot **7** and **8** respectively. From the ends **9** and **10** of the sleeves **5** and **6** arms **11** and **12** respectively depend which are interconnected at **13**. The arms **11** and **12** are in the form of thin elongated strips and they are integral with each other as well as with the associated sleeves **5** and **6** respectively. The assembly of the sleeves **5** and **6** and the arms **11** and **12** is made from a relatively soft synthetic material. The crystal elements **2** and **3** have their main faces arranged at right angles to each other, as appears from FIGURE 3. Also the arms **11** and **12** are at least substantially at right angles to each other.

Within the angle formed at **13** by the arms **11** and **12** a stylus holder **14** is located which has its end provided with a stylus **15**. The stylus holder **14** is secured in a block **16**, made from a resilient kind of synthetic material and for this purpose the block contains an opening **17**. Said block **16** is secured to a substantially gutter-shaped support **18** which has been separately shown in FIGURE 4. Said support **18** has a substantially trapezium-shaped cross-section and may be slid into and out of a slot in the casing **1**, which slot is separately shown in FIGURE 5 and which is generally designated by the reference numeral **19**. The uppermost portion of the slot **19** is formed complementary in respect of the support **18**. The slot **19**, however, is slightly deeper than the height of the support **18**, because in addition to two oblique walls **20** and **21** the slot also has two straight walls **22** and **23**.

In FIGURE 3 the support **18** is shown in its place and it will be seen that a free space **24** is left above the support, which free space is on either side defined by the walls **22**

and 23. On the bottom 25 of the slot 19 a leaf spring 26 is secured which in the inoperative position is bent to extend away from said bottom. From the walls 20 and 21 two projections 27 and 28 project, while in the support 18 complementary shaped recesses 29 and 30 are provided. If the support 18 is to be slid into the slot 19, for which purpose according to FIGURES 1 and 2 the support is to be moved from the left to the right, the lower faces 31 and 32 of the support 18 are to be moved over the projections 27 and 28. The spring 26 is then slightly pressed towards the bottom 25. This means that the stylus holder 14 is moved upwardly together with the support 18, the end 33 of the stylus holder automatically arriving within the angle enclosed by the arms 11 and 12, i.e., above the junction 13. When the recesses 29 and 30 are located above the projections 27 and 28 the spring 26 will be partly released, so that the support 18 is urged away from the bottom 25 of the slot and it will then occupy the position more particularly shown in FIGURES 2 and 3. The end 33 of the stylus holder 14 then bears against the junction 13, a certain pre-stress being imparted to the arms 11 and 12. When the pick-up, in the position shown in FIGURE 2, is placed on a gramaphone record the stylus holder 14 will slightly tilt about the block 16, i.e., to a more horizontal position. The reaction force acting on needle 15 is then taken up by the arms 11 and 12.

FIGURE 6 shows a second embodiment comprising a second stylus 34, the point of which has another radius diameter than the point of the stylus 15, which is of importance for enabling the pick-up to track grooves of different width. The sleeves 5 and 6 are laterally provided with extensions 35 and 36 to which arms 37 and 38 are secured, which at 39 merge in to each other. Within the substantially right angle at 39 between the arms 37 and 38 a stylus holder 40 is located which carries the stylus 34. The other structural details are identical to the corresponding details described hereinbefore and need not be mentioned separately therefore.

In FIGURES 7, 8 and 9 a support of a different construction is shown. Said support 41 has a trapezium-shaped cross-section as may be seen from FIGURE 8 and is located in a recess 42 of the casing 43. In this embodiment the support 41 fits the recess 42 without play, so that the support 41 can only be moved according to a straight path in respect of the casing 43 when it is inserted or removed from the casing. The support again supports a stylus holder 44 with a stylus 45, the stylus holder passing through a strip of elastic material 46 acting as a bearing, which strip of elastic material is secured in the support 41. Two slit-shaped passages 47 and 48 are provided in the support 41. A substantially U-shaped leafspring 49 passes through said passages. The one end of the spring 49 extending through the passage 48 ends in two strips 50 and 51 which extend downwardly on either side of the stylus holder 44 and which engage the resilient strip 46 by means of their hook-shaped ends 52 and 53 respectively. In this manner, therefore, the leaf spring 49 has one end anchored in the support 41. The central portion of the spring 49 is slightly bent upwards at 54, while its end 55 extends through the slit 47. Said end 55 is recessed at 56 and is located very closely to the stylus holder 44. The bent portion 54 of the spring 49 is adapted to cooperate with a projection 57 which forms part of the casing 43 and is secured to the upper wall of the recess 42.

When the support 41 is inserted into the recess 42 in a direction from the left to the right in FIGURE 7, said support after having covered part of its track will start pressing the projection 57 against the central portion of the leaf spring 49. Seeing that the one end of the spring 49 is secured from movement the other free end 55 will be pressed downwardly. The tip of the free end will then start pressing against the stylus holder 44, the recess 56 having a useful stylus holder locating action.

If the portion of the stylus holder 44 which is located at the left in FIGURE 7 has moved downwardly until



it has arrived at the position shown in dotted lines, the right hand portion of the stylus holder will have moved upwardly. The spring 49 and the projection 57 are so arranged that the right hand portion of the stylus holder has been lifted upwardly at the very moment when said portion of the stylus holder has reached the corner 13 between the arms 11 and 12.

When the support 41 has reached the position in which it is entirely inserted in the casing the projection 57 has passed the bent portion 54 of the leaf spring 49, so that the free end 55 of the leaf spring 49 has again moved upwardly and consequently the stylus holder 44 has been released at the very moment when its right hand end has reached the correct position.

When the support is taken out of the casing the reverse naturally takes place, so that the stylus holder 44 will again make a tilting movement at the same moment when the right hand end of the stylus holder will start disengaging the arms 11 and 12. There is no chance therefore of too large a pressure being exerted on the arms 11 and 12 when the support is detached from the casing.

In the embodiments described hereinbefore the coupling means already have a certain pre-stress after the mounting of the stylus holder, which pre-stress is in point of fact generated by a certain deformation of the elastic block in which the stylus holder is supported.

According to an alternative embodiment the stylus holder is free from the coupling means as long as the pick-up does not bear on a record. In this case therefore a stress in the coupling means will only come to being when the pick-up is in its operative position.

I claim:

1. In a binaural cartridge means for use with V-groove sound records having separate undulations on the opposed faces of the groove casing means, support means, a pair of transducer means each having a mounting portion and a driven portion, means to attach the mounting portions of the transducer means to said casing means to position the driven portions in spaced side-by-side relationship, coupling means including a pair of downwardly convergent arms arranged generally normal to the planes of the respective faces of a V-groove and flexurally joined at their lower ends, means to mount the coupling means to operatively engage the upper portions of the arms with the driven portions of the respective transducer means, stylus means including an elongated shank having a stylus tip at one end, means to pivotally mount said shank on said support means, said support means being removably attached to said casing means, said support means being engaged with the shank medially of the ends thereof to position the other end of the shank in operative engagement with said juncture of coupling arms when the support means is attached to the casing means to exert a downwardly directed initial stress on said arms under no-load conditions.

2. The invention as defined in claim 1, wherein the lower ends of the coupling arms define an acute angle at said flexural juncture, and said other end of the shank is received within the space defined by said acute angle to bear downwardly against said arms at said juncture.

3. The invention as defined in claim 2, wherein said pivotal mounting means for the stylus shank includes a resilient element connected between the shank and the support means.

4. The invention as defined in claim 1, wherein said casing means is provided with a slideway extending in a direction normal to the plane of the coupling means, and said support means for the stylus shank includes slide means receivable in said slideway.

5. The invention as defined in claim 4, wherein said support means includes a resilient element and said stylus shank is pivotally connected to the support means by said resilient element, said shank being normally mounted in an inclined position with the stylus tip at the lower end and the other end of the shank being positioned for

engagement with the coupling means when the support means is moved rearwardly.

6. The invention as defined in claim 5, wherein said other end of the stylus shank will exert an initial downward force against the coupling means when moved into engagement therewith.

7. The invention as defined in claim 4, wherein said slideway includes a longitudinally extending recess provided in said casing means, said recess having opposed inclined walls, said support means being provided with inclined side walls for dovetailed sliding engagement with walls of the recess, the height of the support means being less than that of the recess, and biasing means positioned in said recess for engagement with the top of the support means to urge the side walls of the support means into engagement with the side walls of the recess.

8. The invention as defined in claim 7, wherein one of said side walls is provided with projecting detent means, the respective complementary side wall being provided with a recess to receive said detent means, said detent being positioned to limit rearward movement of the support means, said support means being upwardly tiltable against said biasing means to clear said detent and permit further rearward movement of the support means, and downwardly tiltable after said further rearward movement into operative position when the detent is in alignment with its cooperating recess.

9. The invention as defined in claim 8, wherein the pivotal mounting includes a resilient element to connect said shank with the support means whereby said other end of the stylus shank will exert an initial downward force against the coupling when downwardly tilted into engagement therewith.

10. In a binaural sound reproducing cartridge means for use selectively with sound records having grooves of differing physical characteristics, said grooves being of the character wherein two distinct undulatory surfaces are impressed therein, including, support means, a pair of transducer means having a mounting portion and a driven portion, means to attach said mounting portions to the support means, first and second stylus means, each said stylus means being physically compatible with a particular character of record groove, means to attach said stylus means to the support means for selective engagement with a record groove, and coupling means to transmit vibrations from either one of said stylus means to both said transducer means, said coupling means including first and second vibration transmitting mechanisms, each said mechanism including a driven portion and two driving portions and including energy-discriminating elements whereby vibrations from the respective undulatory surfaces of a groove are transmitted separately to the respective driving portions of the mechanism, the force transmitting characteristics of one said mechanism differing from the force transmitting characteristics of the other mechanism, and means to mount said coupling means to position the driven portions of the vibration transmitting mechanisms in operative engagement respectively with said first and second stylus means and to position one of the driving portions of each vibration transmitting mechanism in operative engagement with the driven portion of one of the transducer means and the other of the driving portions of each vibration transmitting mechanism in operative engagement with the driven portion of the other transducer means.



11. The invention as defined in claim 10, wherein said transducer means comprises two elongated flat strips of piezoelectric material, said strips being mounted in spaced parallel relationship, said coupling means is integrally formed of elastomeric material, and said means to connect the coupling means to the transducers comprises a pair of sleeve means formed integrally with the coupling means of elastomeric material to embrace the respective one ends of the piezoelectric strips.

12. The invention as defined in claim 11, wherein said piezoelectric strips are disposed in angularly related planes, said coupling means including two pairs of L-shaped levers, one leg of each of the L-shaped levers in one pair of said levers being formed by a pair of integrally formed projections each extending respectively from a respective sleeve means in the plane of a respective piezoelectric strip, the corresponding leg of each of the L-shaped levers in the second pair of levers being formed by a pair of integrally formed projections each extending respectively from a respective sleeve means in a plane normal to the plane of a respective piezoelectric strip.

13. The invention as defined in claim 12, wherein the length of the first-mentioned projections is greater than the length of the last-mentioned projections.

**References Cited** in the file of this patent

UNITED STATES PATENTS

2,934,610 Dieter ---------- Apr. 26, 1960