

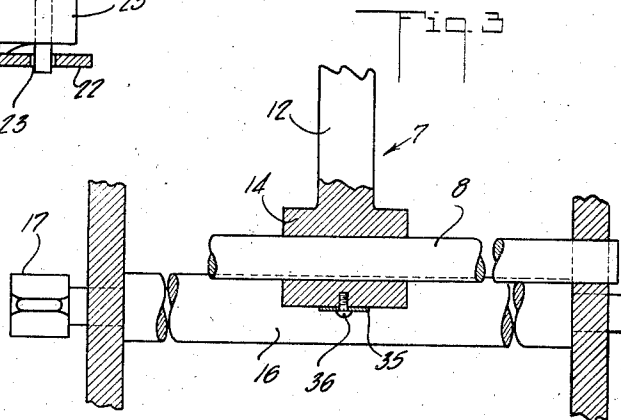
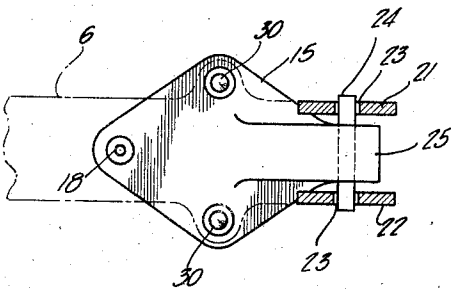
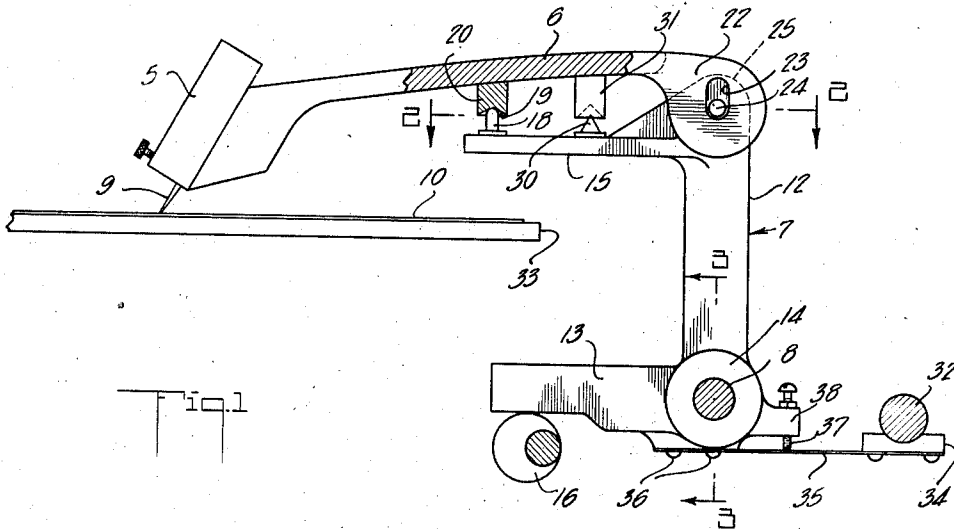
April 22, 1941.

F. D. BANNING
STYLUS HEAD MOUNTING

2,239,359

Filed Dec. 23, 1939

2 Sheets-Sheet 1



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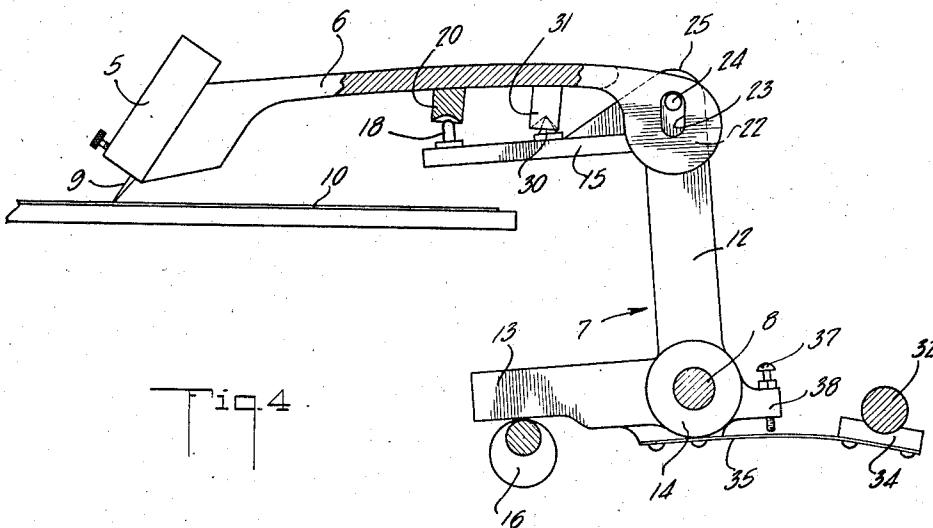
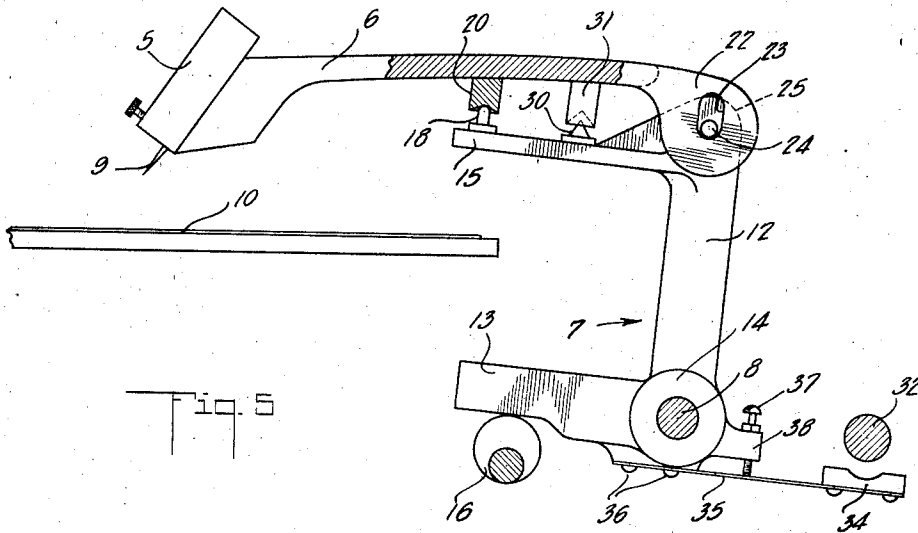
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STYLUS HEAD MOUNTING

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5 Claims. (Cl. 274—23)

This invention relates to a mounting for a combination sound recorder and reproducer head.

In the phonograph art, it is frequently desirable to have a machine which can be used either for making records (recording) or reproducing records (sometimes called play back). In such a dual purpose machine, it is common to use a combination stylus head, that is one that can be used either for recording or reproduction by appropriate changes in the connections of the amplifier with which the head is being used. This of course refers to an electrical head; if the head is purely mechanical, no amplifier is used.

In either case, when the head is used for reproduction, it must be free to follow variations in the record surface in a direction transverse to this surface. Further, when the carriage is positively moved to cause the head to traverse the record at the same rate as the record groove, a limited amount of free lateral movement between the head and the carriage is necessary to permit the stylus to accurately follow the record groove. Also a relatively light pressure is required on the stylus.

When the head is used for recording in accordance with the usual practice, free movement transverse to the recording surface is still required to allow the stylus to follow the record surface. On the other hand, since the stylus must now form the record groove, no lateral freedom between the carriage and the head is permissible, but the head must be advanced by the movement of the carriage. Further, the stylus must be urged against the record blank with a greater pressure.

It is of course also necessary to lift the stylus entirely off the record surface when it is desired to remove the record, or to adjust the stylus forward or backward relative to the record groove.

It is a principal object of this invention to provide an improved mounting for a stylus head for optionally allowing the head lateral compliance for reproduction, locking the head against lateral compliance and increasing the weight or pressure on the stylus for recording, or lifting the head so that the stylus will be free of the record surface.

It is another object of this invention to provide such a mechanism comprising a simple unitary structure.

It is still another object of this invention to provide such a mechanism which accomplishes its results without the use of springs.

This invention possesses many other advantages, and has other objects which may be made more easily apparent from a consideration of one embodiment of the invention. For this purpose there is shown a form in the drawings accompanying and forming part of the present speci-

fication. This form will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of this invention is best defined by the appended claims.

In the drawings:

Figure 1 is an elevational view, largely diagrammatic, showing the improved mounting;

Figs. 2 and 3 are detail sections as seen on correspondingly numbered planes of Fig. 1;

Fig. 4 is a view similar to Fig. 1 showing an alternate position of the parts; and

Fig. 5 is another view similar to Fig. 1 showing a further alternate position of the parts.

Referring to the drawings, a combination recording and reproducing head is indicated by 5, and is attached to one end of an arm 6 mounted on carriage 7. The carriage 7 is slidably supported on a guide rod 8, so arranged that movement of the carriage 7 along rod 8 will cause the stylus 9 carried by head 5 to move across the surface of a record 10 in a well understood manner. Although the record 10 is shown as of disc form, it is obvious that it could equally well be of any other well known type, as for example, cylindrical.

Carriage 7 is so arranged as to be capable of angular adjustment about its supporting bar 3 to any one of three positions, the arrangement being such that in one position the arm 6 is lifted so that stylus 9 is clear of record 10; in another position arm 6 is supported for universal movement with respect to carriage 7; while in the third position, arm 6 is confined to pivotal movement in one plane with respect to carriage 7, and the fulcrum point is changed, so that a larger portion of the weight of arm 6 and head 5 urges stylus 9 against the surface of record 10.

Carriage 7 is shown as comprising a bell crank having an upwardly extending arm 12, and arm 13 transverse thereto, these arms being joined to a hub 14 through which the guide rod 8 passes. Arm 12 has a platform 15 above arm 13, and serving to support arm 6. The weight of these tends to rotate carriage 7 in a counterclockwise direction about bar 3, this tendency being opposed by arm 13 engaging a cam 16. By turning this cam 16, as by a finger grip 17, the angular position of carriage 7 about bar 3 may be altered.

Near the outer end of platform 15 is an upwardly projecting pin 18 having a convex upper surface upon which rests the concave lower surface 19 of a boss 20 depending from arm 6. Adjacent that end of arm 6, opposite the head 5, is a pair of downwardly extending cheeks 21, 22 (Figs. 1 and 2), respectively on opposite sides of the arm. Each cheek has a slot 23 through which a pin 24 in the upper end 25 of arm 12 extends.

Arm 6 is free to swing universally on supporting pin 18, the vertical movement being restrained by the ends of slots 23 engaging pin 24, the lateral movement being limited by cheek 21 or 22 engaging the side of end 25 of arm 12. This is the condition for reproduction or play back since the stylus is free to follow vertical as well as lateral deviations of the record groove. The freedom of movement allowed is ample to take care of any irregularities in the record. The weight of head 5 and that part of arm 6 to the left of pivot 18 is partly counterbalanced by cheeks 21, 22 and the part of arm 6 to the right of pivot 18, so that the proper light pressure urges stylus 9 against the record 10 for reproduction.

Arm 6 is thus supported by stylus 9 and pin 18 (see Fig. 1).

If now the cam member 16 is turned counterclockwise through approximately 90°, carriage 7 will also rotate in that direction through a small angle, which will lower pin 18 and allow arm 6 to swing downward about the point of stylus 9, until a pair of pins 30 (Fig. 2) carried on platform 15 engage bosses 31 on arm 6 and pin 18 moves free of surface 19 (Fig. 4). These pins may have conical or pointed ends which engage correspondingly shaped recesses in bosses 31.

Arm 6 is now supported on stylus 9 and pins 30. Thus arm 6 is restrained against lateral movement but is still free to swing in a vertical plane, the pointed pins 30 serving to accurately position arm 6 relative to the carriage. This is the condition for recording (see Fig. 4). Further, the fulcrum point has been moved away from the head 5, thus there is less counterbalancing of the weight of head 5, etc., and the force urging the stylus against the record is materially increased.

It will be understood that in the recording as well as the reproducing conditions just described, the carriage 7 is moved so as to cause head 5 to travel across the record at the same rate as the record groove. One means for accomplishing this is shown. Thus, a threaded rod 32 may be provided, this rod being driven by appropriate mechanism with respect to the record carrying member 33. The pitch of the threads on rod 32 and the rate at which it is driven must of course be properly correlated to the speed of the record and the pitch of the sound groove, already on the record or being cut thereon.

Rod 32 is threadedly engaged by a feed nut 34 secured on a spring arm 35 which is attached to carriage 7 in any convenient manner as by screws 36. The flexibility of arm 35 permits carriage 7 to move counterclockwise around rod 8 to recording position in response to movement of cam 16. This movement serves to increase the tension of nut 34 against threaded rod 32, which is desirable when recording.

When it is desired to lift stylus 9 free from the record 10, cam 16 is turned clockwise approximately 90° from the position of Fig. 1, this causing carriage to swing clockwise about its support 8 and raising pin 18. This will raise arm 6 about stylus 9 as a pivot until the lower end of slots 23 engages pin 24, after which arm 6 will swing with arm 7, lifting stylus 9 from the record surface (see Fig. 5). At the same time, spring arm 35 will swing downwardly, moving nut 34 out of engagement with rod 32, so that carriage may be slid along rod 8 in either direction. An ad-

justing screw 37 threadedly mounted in lug 38 on carriage 7 provides means for properly adjusting the tension of spring 35.

What is claimed is:

1. In a device of the character described, a stylus head, an arm for supporting said head, a carriage, means forming a pair of bearing supports for the arm, comprising sets of cooperating bearing elements on the arm and on the carriage, said sets being at different distances from the head, and means for adjusting the carriage for causing either of the sets to be placed in cooperative relation.

2. In a device of the character described, a stylus head, an arm for supporting said head, a carriage, means forming a pair of bearing supports for the arm, comprising sets of cooperating bearing elements on the arm and on the carriage, said sets being at different distances from the head, and means for adjusting the carriage for causing either of the sets to be placed in cooperative relation, one of said sets comprising a ball and socket joint, whereby the arm is allowed universal movement with respect to the carriage, the other set comprising a pivot, whereby the arm is restricted to movement in a single plane with respect to the carriage.

3. In a device of the character described, an arm, a stylus head on said arm adapted to rest on a record, a carriage, means forming a pair of bearing supports for the arm, comprising sets of cooperating bearing elements on the arm and on the carriage, said sets being at different distances from the head, said arm extending from the head beyond said sets to provide a counterweight for the head, and means for adjusting the carriage for causing either of the sets to be placed in cooperative relation, whereby the amount of counterweight acting on the head is altered.

4. In a device of the character described, an arm, a stylus head on said arm adapted to rest on a record, a carriage, means forming a pair of bearing supports for the arm, comprising sets of cooperating bearing elements on the arm and on the carriage, said sets being at different distances from the head, said arm extending from the head beyond said sets to provide a counterweight for the head, and means for adjusting the carriage for causing either of the sets to be placed in cooperative relation, whereby the amount of counterweight acting on the head is altered, one of said sets comprising a ball and socket joint, the other set comprising a pivot, whereby the freedom of movement of the arm with respect to the carriage is altered at the same time as the counterweight effective on the head is altered.

5. In a device of the character described, an arm carrying a stylus head adjacent one end, said head being adapted to rest on a record, a carriage, means forming a pair of bearing supports for the arm, comprising sets of cooperating bearing elements on the arm and in the carriage, and means for adjusting the carriage for causing either of the sets to be placed in cooperative relation, said sets being at different distances from the head, whereby the overhang of the arm depends on the chosen set and the weight of the stylus on the record is altered accordingly.

FREDERICK D. BANNING.