

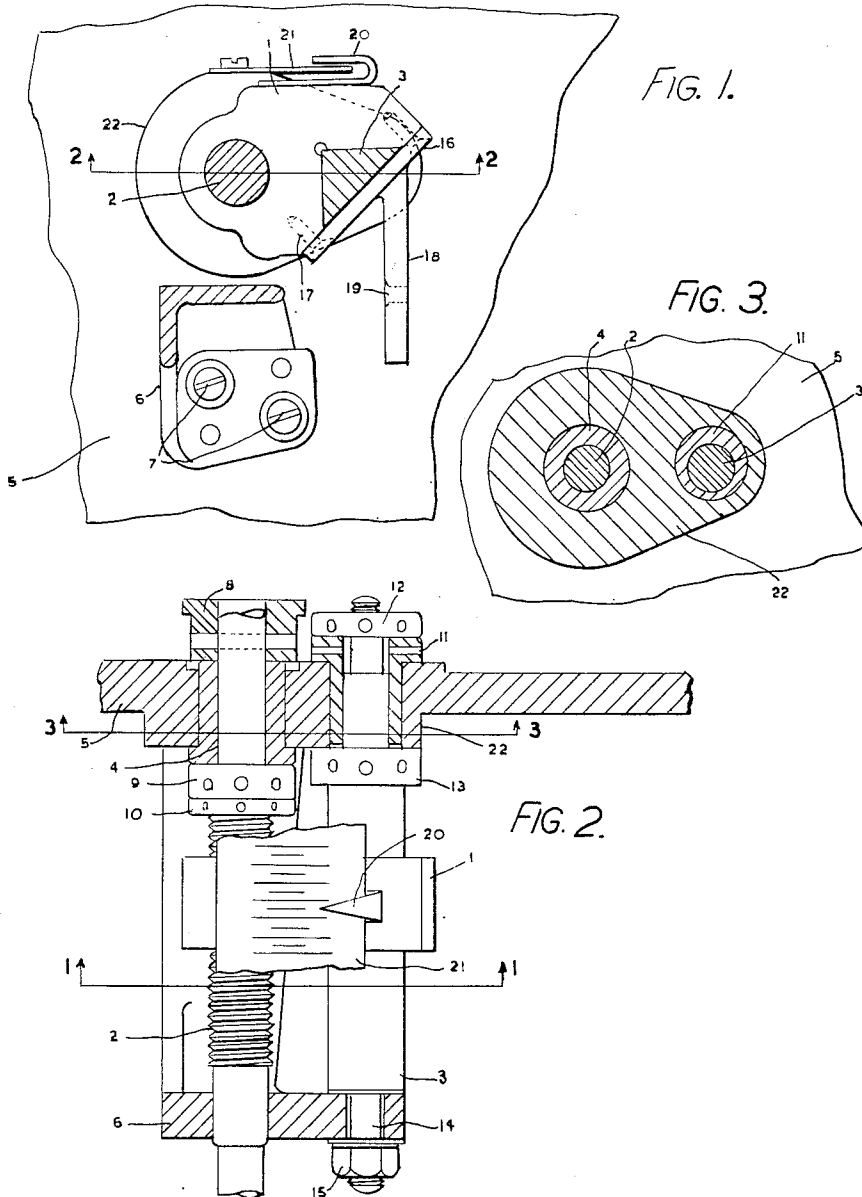
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RECORDING HEAD CARRIAGE GUIDING MEANS

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## UNITED STATES PATENT OFFICE

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RECORDING HEAD CARRIAGE  
GUIDING MEANS

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This invention relates to apparatus for recording sound on an endless band.

One method of recording sound consists of forming a groove, modulated in accordance with the sound to be recorded, in an endless band of suitable material, e. g. film having a basis of cellulose acetate, the recording head carrying the groove-forming tool being slowly moved across the band so that by the time that part of the band where the groove starts again reaches the tool the latter has moved sufficiently to permit continuation of the groove to one side of the part earlier formed; the band thus appears eventually to have a number of parallel grooves formed in it side by side. The carriage on which the recording head is mounted comprises a nut threaded on to a lead screw rotation of which drives the carriage, and hence the recording head, across the band.

The invention is concerned with sound recording apparatus of the type described and, more particularly, with improved means for supporting and guiding the recording head carriage. The invention is of particular value where it is desired that the recording head should be able to move transversely but not otherwise in relation to an abutment for the band at the recording point.

According to the invention, in apparatus of the class described, the carriage for the recording head comprises a member operatively engaging the thread of a lead screw and guide means adapted to constrain the motion of the carriage to a simple rectilinear translation independently of said lead screw, whereby the function of said lead screw is limited to imparting said translation.

The construction of the present invention offers substantial advantages over previous devices, in particular in that the novel construction reduces very considerably, or even eliminates, the possibility of uneven wear on the means for feeding the head transversely during the passage of the band. When a single guide rod of circular cross-section is used as in previous devices, this guide rod acts as a pivot and consequently the weight of the recording head and its carriage is applied to one side of the lead screw which is employed for moving the head transversely and furthermore part of the cutting resistance of the band is also applied to the same part of this lead screw. In practice, this is liable to result in the lead screw becoming slightly eccentric so that in operation the recording head, and with it the tip of the recording stylus, is moved up and

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down and the amount of movement is equal to double the eccentricity developed on the lead screw which has a considerable effect on the quality of the recording. By means of the present invention, it is possible to construct recording apparatus of the type described the operation of which will not be deleteriously affected in the manner indicated, even after use over an extended period.

In the accompanying drawings, which illustrate one embodiment of the invention:

Fig. 1 shows a side elevation, in part section along line 1-1 of Figure 2, and

Fig. 2 shows a plan view, in part section along the line 2-2 of Fig. 1, of a cutting head carriage and means for supporting and guiding the carriage in accordance with the invention.

Fig. 3 shows a section along the line 3-3 of Fig. 2.

Referring to the drawings the cutting head carriage comprises the nut 1, threaded on the lead screw 2 and supported and guided, independently of the lead screw, by guide rod 3 of right-triangular cross-section. The lead screw 2 is journaled at one end in a bearing 4 secured in the main panel 5 of a recording apparatus and at the other end in a bracket 6 secured to the panel by screws 7. Axial movement of the lead screw is restrained by collar 8 pinned to the plain end of the lead screw and nut 9 and locknut 10. The bracket end of the lead screw carries a handle (not shown) for manual operation of the lead screw which is normally driven by gearing (not shown) connected to the panel end of the lead screw. The guide rod 3 is secured to an eccentric bush 11 in panel 5 by nuts 12 threaded on to the end of the guide rod, a keyed shoulder 13 being provided on the guide rod to facilitate angular adjustment thereof, the bush 11 likewise being keyed as shown to facilitate its rotation in the panel 5. The cylindrical extremity 14 of the guide rod remote from the panel is carried in bracket 6 which is bored to a clearance fit for the said cylindrical extremity. Nut 15 threaded on to extremity 14 secures guide rod 3 in place after adjustment. The nut 1 is threaded on to lead screw 2 and is shaped (as shown in Fig. 1) to engage the narrow faces of guide rod 3. Plate 16 is secured to nut 1 by screws 17 so as to engage the wide face of guide rod 3. Plate 16 carries dependent lug 18 which is provided with countersunk holes 19 whereby a cutting head, or a mounting for a cutting head which provides for adjustment of the height of the cutting head, can be secured to the carriage.

Pointer 20 is secured to the nut 1 and arranged to co-operate with scale 21 secured to boss 22 on main panel 5 and extending over the path of the nut 1. Conveniently the scale may carry graduations indicating the time occupied by the recording made and accordingly of the remaining time before the spool of film in the apparatus is fully recorded.

It will be appreciated that in the construction shown, angular adjustment of the guide rod 3 by rotation of keyed shoulder 13, and adjustment of the distance between guide rod 3 and lead screw 2 by rotation of eccentric bush 11, are simple to make and enable the position of guide rod 3 to be chosen with great accuracy so that the whole weight of the carriage, as well as the cutting head and any adjusting mechanism mounted thereon, is borne by the guide rod 3 so that, in operation, the lead screw 2 performs only the function of imparting motion to the carriage and whatever is mounted thereon.

While the invention has been described more particularly in connection with the use of a guide rod of triangular cross-section it will be appreciated that the object of the invention can be achieved with other constructions. Thus a guide rod of any cross-section other than circular, e.g. semi-circular, or a plurality of parallel guide rods of circular or other cross-section may be used.

Having described my invention, what I desire to secure by Letters Patent is:

1. In apparatus for recording sound on an endless band of material, the combination of a panel, a lead screw rotatably mounted thereon, an eccentrically bored bush axially adjustable in said panel, a guide rod axially adjustable in said bush, the axes of said lead screw and guide rod being parallel in a common plane for all axial positions of said bush and rod, means for securing said bush and rod against adjustment, a portion of non-circular cross-section on said rod, and a carriage in driven engagement with said lead screw and sliding engagement with said rod along its portion of non-circular cross-section.

2. In apparatus for recording sound on an endless band of material, the combination of a panel,

a lead screw rotatably mounted thereon, an eccentrically bored bush axially adjustable in said panel, a guide rod axially adjustable in said bush, the axes of said lead screw and guide rod being parallel in a common plane for all axial positions of said bush and rod, means for securing said bush and rod against adjustment, a portion of triangular cross-section on said rod, and a carriage in driven engagement with said lead screw and sliding engagement with said rod along its portion of triangular cross-section.

3. In apparatus for recording sound on an endless band of material, the combination of a panel, a lead screw rotatably mounted thereon, an eccentrically bored bush axially adjustable in said panel, a guide rod axially adjustable in said bush, the axes of said lead screw and guide rod being parallel in a common plane for all axial positions of said bush and rod, means for securing said bush and rod against adjustment, a portion of right triangular cross-section on said rod, and a carriage in driven engagement with said lead screw and grooved to provide sliding engagement with the two faces of the triangular portion of said guide rod which are at right angles and a plate carried by the carriage and engaging slidably the third face of said guide rod.

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