March 21, 1944. C. D. SHRADER 2,344,646

SOUND RECORDING APPARATUS

Filed Nov. 28, 1941 7 Sheets-Sheet 1

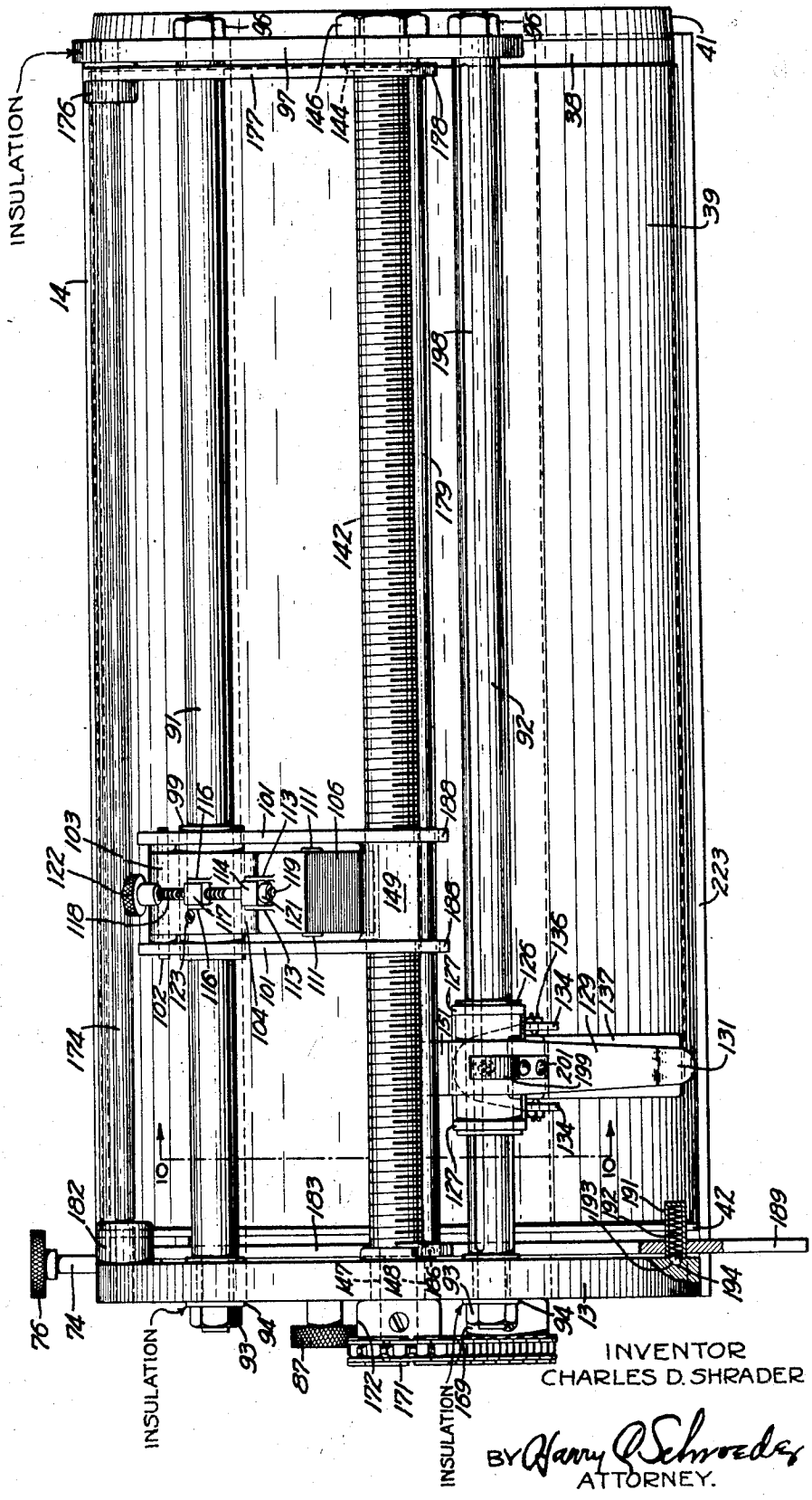


FIG. 1

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SOUND RECORDING APPARATUS

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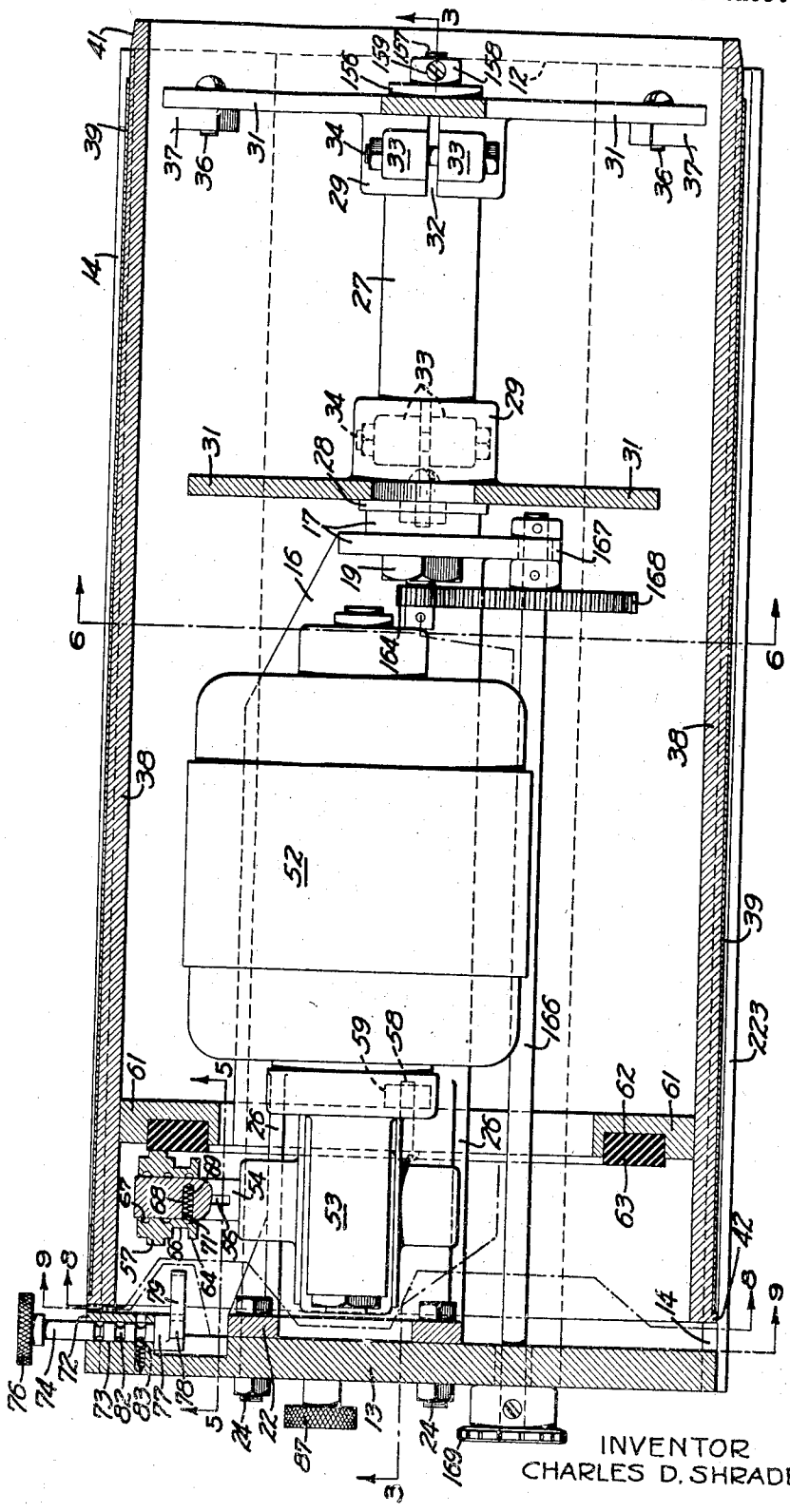


FIG. 2

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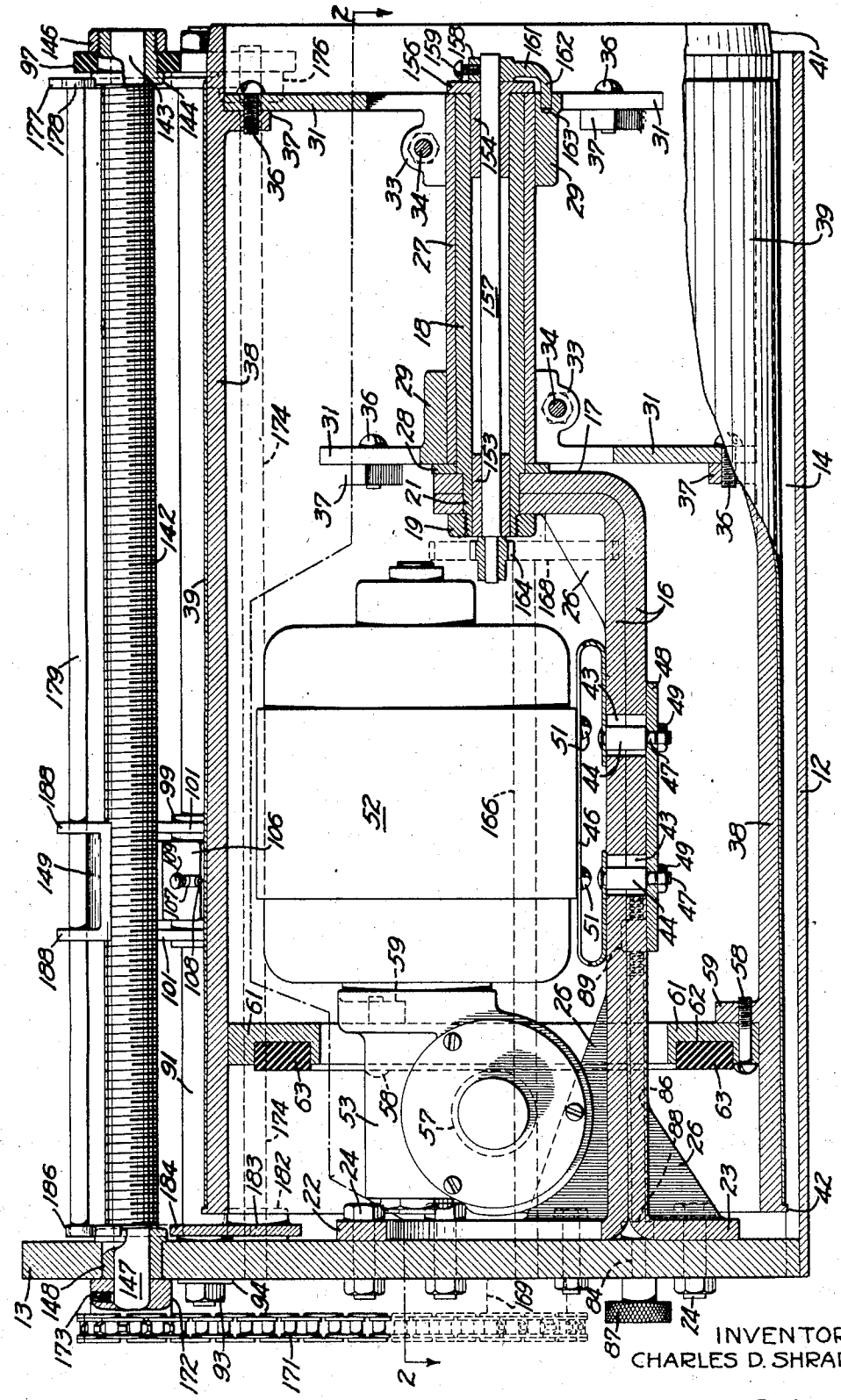


FIG. 3

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SOUND RECORDING APPARATUS

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FIG. 4

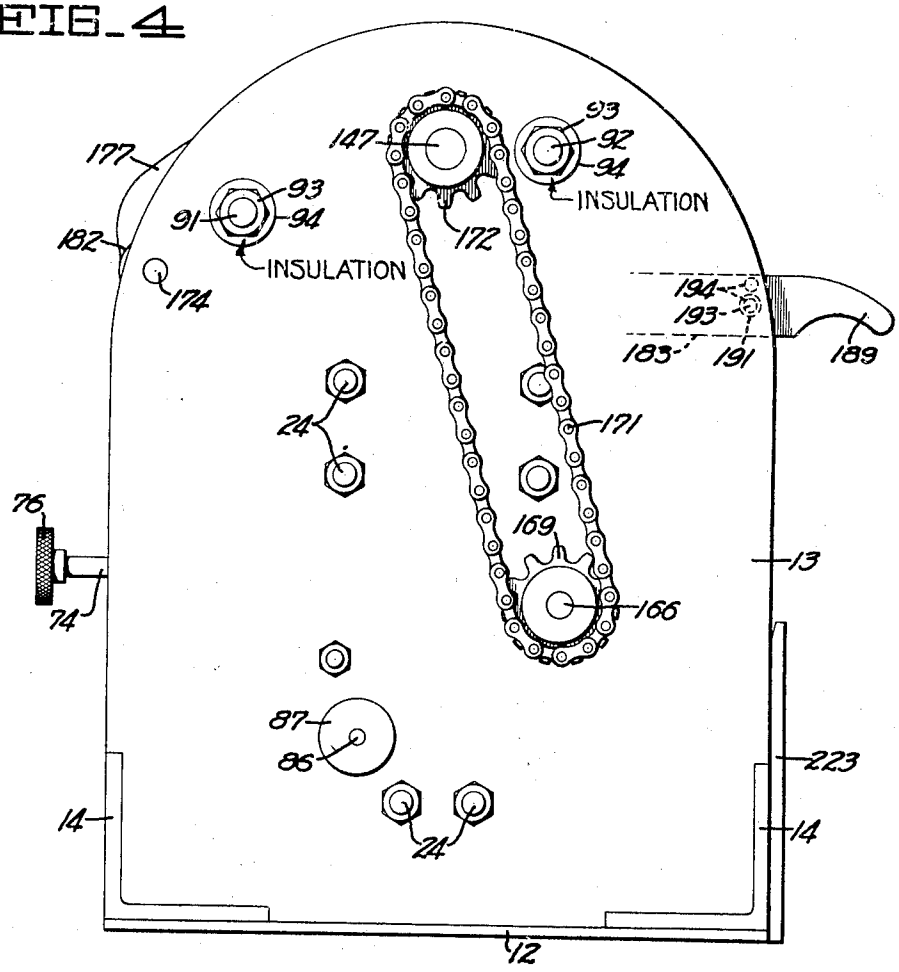
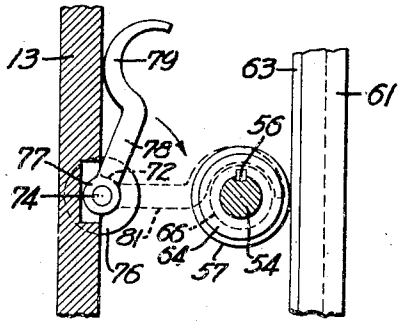


FIG. 5



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SOUND RECORDING APPARATUS

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FIG. 6

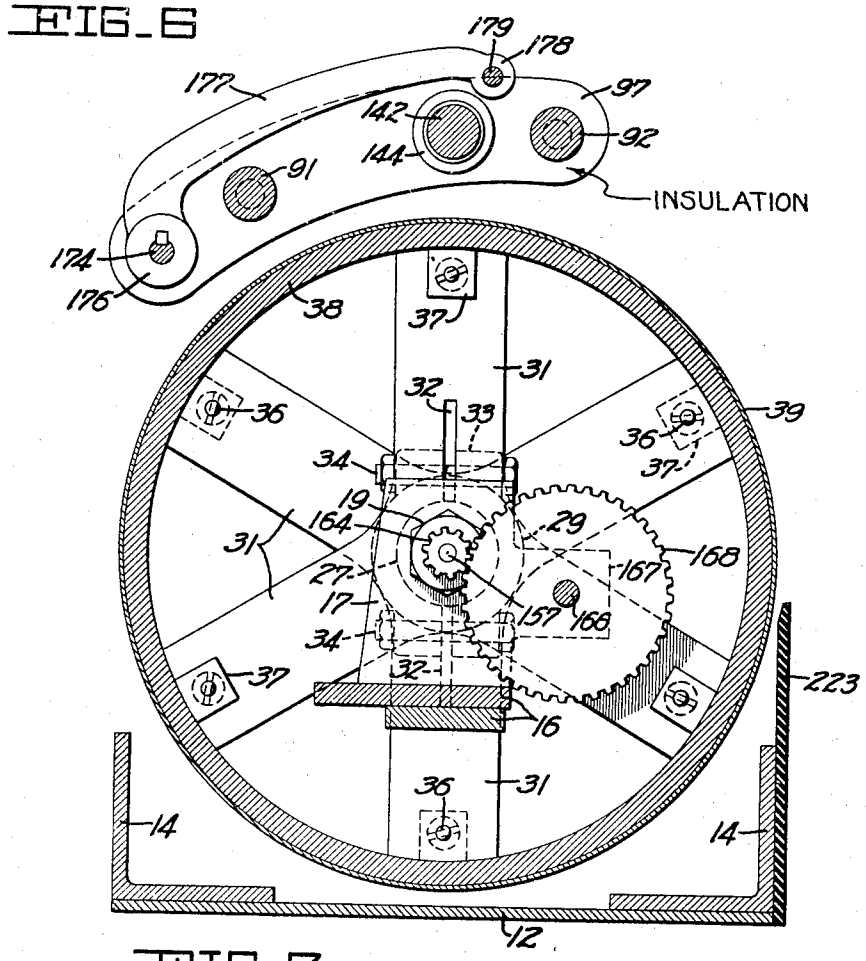
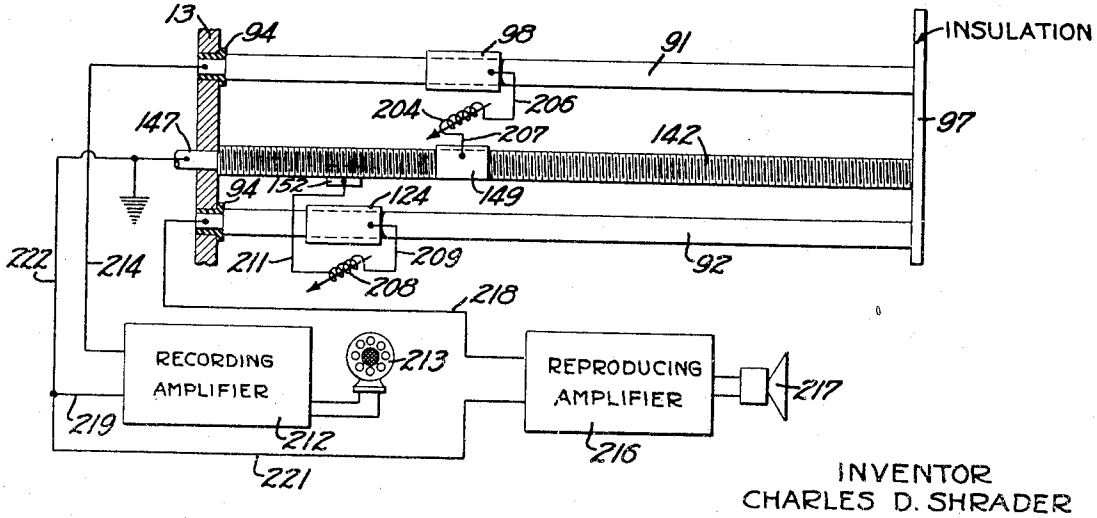


FIG. 7



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SOUND RECORDING APPARATUS

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FIG. 8

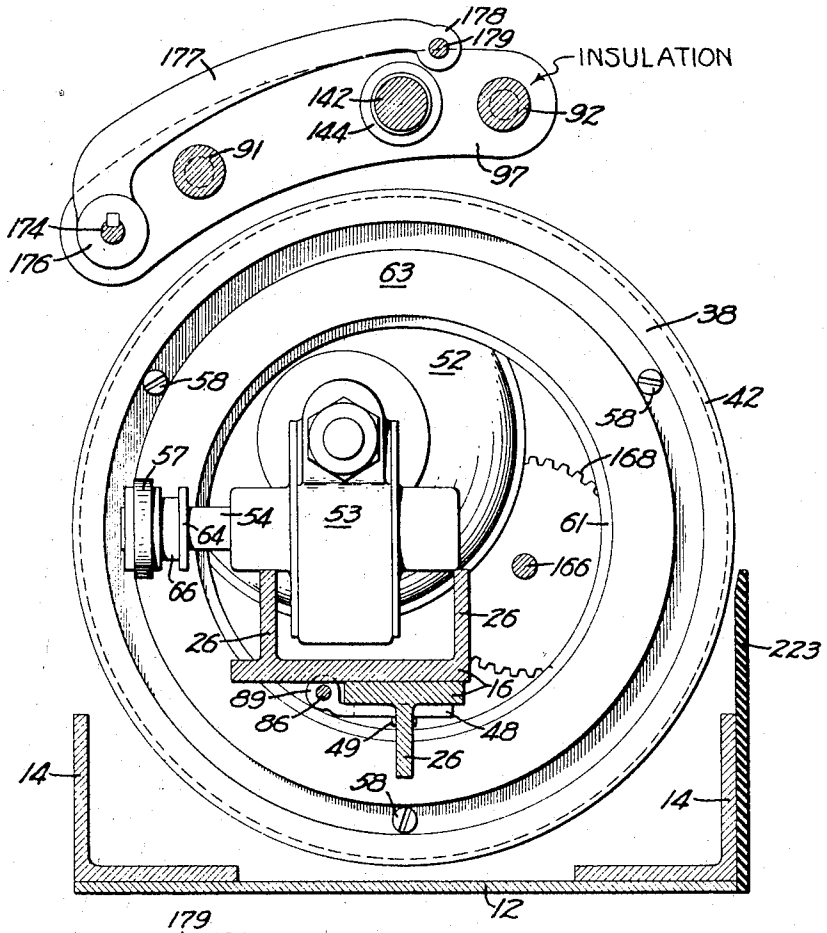
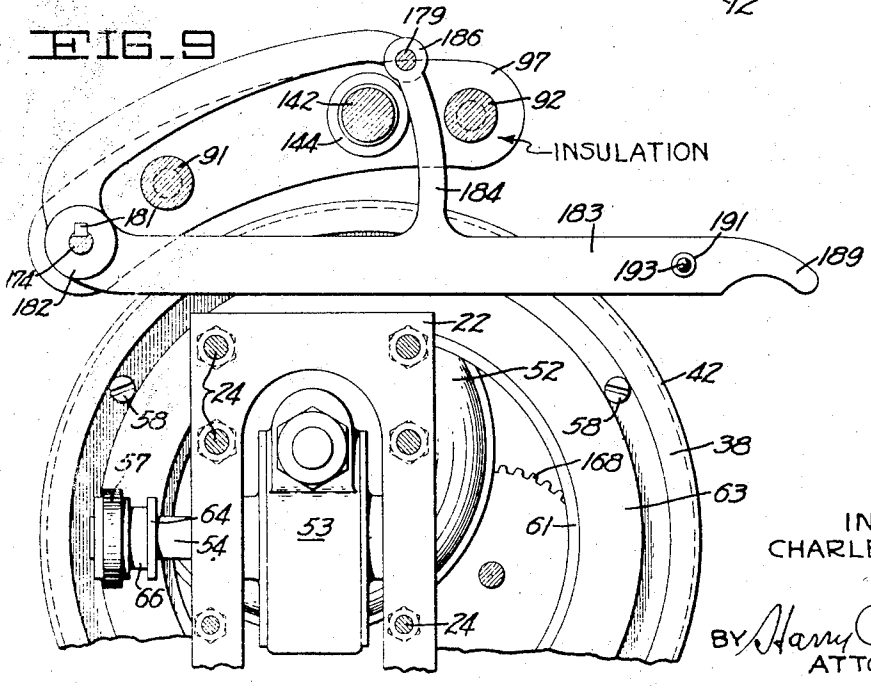


FIG. 9



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FIG. 10

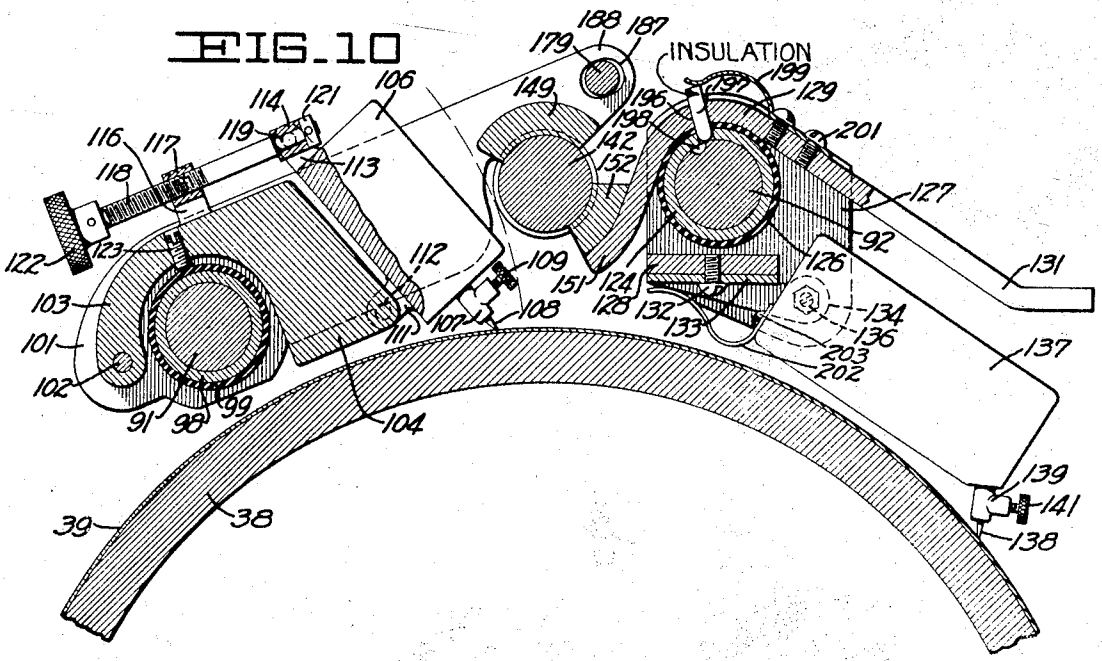
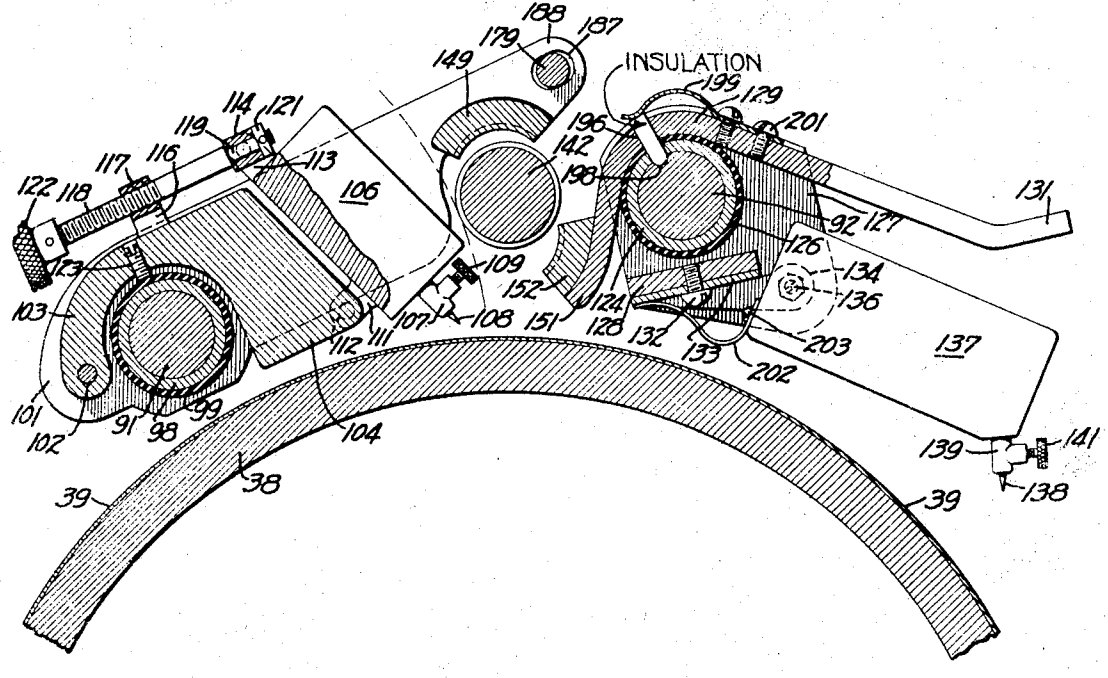


FIG. 11



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Patented Mar. 21, 1944 2,344,646

UNITED STATES PATENT OFFICE

2,344,646

SOUND RECORDING APPARATUS

Charles D. Shrader, Oakland, Calif.

Application November 28, 1941, Serial No. 420,847

5 Claims. (Cl. 179—100.4)

This invention relates to mechanism for producing permanent sound records and reproducing sound from said records, and is a division of my prior application Serial No. 307,352, filed December 4, 1939.

It is an object of the invention to provide a sound recorder which permanently engraves a sound record on flexible film which may be folded flat for filing or mailing.

Another object of the invention is to provide a sound recorder of the class described which is relatively small in size and yet possesses extraordinarily large record capacity.

A further object of the invention is to provide a device of the character described which permits of simultaneous recording and reproduction.

A still further object of the invention is to provide a sound recorder which utilizes, as its record, a sleeve of low-cost flexible film.

Still another object of the invention is to provide, in a sound recorder using a cylindrical drum, novel drive means for the drum which is contained substantially wholly within the latter.

Yet another object of the invention is to provide novel mounting means for the recording and reproducing devices and also novel means for conducting electric currents to and from, the recording and reproducing devices.

The invention possesses other objects and features of advantage, some of which, together with the foregoing, will be specifically set forth in the detailed description of the invention hereunto annexed. It is to be understood that the invention is not to be limited to the specific form thereof herein shown and described as various other embodiments thereof may be employed within the scope of the appended claims.

Referring to the drawings:

Figure 1 is a top plan view of the complete recorder and reproducer. A portion of the view is broken away and shown in section so as to more clearly disclose the internal construction.

Figure 2 is a horizontal sectional view of the structure shown in Figure 1. The view is taken substantially along the plane indicated by the line 2—2 of Figure 3.

Figure 3 is a vertical sectional view of the recorder and reproducer. The view is taken substantially along the plane indicated by the line 3—3 of Figure 2.

Figure 4 is an end elevational view of the apparatus.

Figure 5 is a fragmental vertical sectional view of the speed change mechanism. The plane in which the view is taken is indicated by the line 5—5 of Figure 2.

Figure 6 is a transverse vertical sectional view of the apparatus. The plane of section is indicated by the line 6—6 of Figure 2.

Figure 7 is a schematic wiring diagram showing the electrical circuits associated with the apparatus.

Figure 8 is a transverse vertical sectional view of the apparatus. The plane of section is indicated by the line 8—8 of Figure 2.

Figure 9 is a transverse vertical sectional view of the apparatus. The plane of section is indicated by the line 9—9 of Figure 2.

Figure 10 is a transverse vertical sectional view of the apparatus showing the recording and reproducing heads in their operative positions. The plane in which the view is taken is indicated by the line 10—10 of Figure 1.

Figure 11 is a view, similar to Figure 10, showing the recording and reproducing heads in their respective inoperative positions.

In detail, the apparatus comprises a base plate 12 having secured to and rising from one transverse end thereof an end plate 13. Angle bars 14, secured to the opposite longitudinal edges of the base plate 12, and at one end to the end plate 13, are provided for lending rigidity to the base plate and vertical stability to the end plate. As is best shown in Figure 3, a motor support bracket composed of contiguous integrally connected bars 16 is spaced from and parallels the base plate 12, both bars at one end being bent upwardly to form a support 17 for tubular stub shaft 18 which is secured in a suitable aperture formed in the support 17 by a nut 19 which engages the threaded shank 21 of the stub shaft. The opposite ends of the bars 16 are each bent in opposite directions, at right angles to the bars, to form flanges 22 and 23 having apertures formed therein axially alined with corresponding apertures formed in the end plate 13 and through which pass bolts 24 which secure the motor support bracket to the end plate. Ribs 26 are preferably welded to the bars 16 at their several angular bends so as to stiffen the bars.

Journaled on the stub shaft 18 is a sleeve 27 between one end of which and the stub shaft support 17 is a spacing washer 28. Positioned at opposite ends of the sleeve 27 are spiders each comprising a centrally bored hub 29, through which the sleeve passes, having a plurality of arms 31 radiating therefrom. Each hub, as is shown in Figure 6, is cut by a longitudinal slot 32, which also extends part way along one of

the arms 31, and is provided with integral bosses 33 which are axially bored and receive clamp bolts 34 by means of which the hubs 29 are clamped to and fixed for rotation with the sleeve 27. The outer end of each of the spider arms 31 is attached by a screw 36 to a lug 37 formed integrally with and extending radially from the inner periphery of a cylindrical drum 38 which is axially concentric with the stub shaft 18 and is rotatable about the said stub shaft axis. The outer periphery of the drum 38 is, as will be seen upon careful examination of Figure 1, slightly tapered longitudinally so that when the tubular film record 39 is telescoped over and pushed toward the enlarged end of the drum a secure frictional engagement between the record and the drum will obtain. The smaller end of the drum is preferably provided with a bevel 41 which facilitates starting the tubular record on to the drum and the larger end of the latter is fitted with a flange 42 against which one edge of the record may abut.

Means is provided for rotating the drum and the record mounted thereon. As will best be seen in Figure 3, the motor support bracket is provided with a pair of spaced radially elongated apertures 43 in which are positioned studs 44 each being attached to its upper end to the ends of a loop 46 of spring sheet material. The lower end of each stud is provided with a diametrically reduced shank 47 which passes through an aperture formed in a slide 48, the stud being secured to the slide by means of a nut 49 threadedly engaged with the stud shank 47. The arrangement of the parts is such that the assembly of the loop 46, the studs 44, and the slide 48, may be moved back and forth longitudinally of the motor support bracket within the limits of the elongation of the apertures 43. Mounted by screws 51 on the loop 46 is a motor 52 having attached to one end thereof a housing 53 containing a worm reduction gear which drives at low speed, a transversely disposed shaft 54 which extends from the housing 53. The shaft 54 is provided with a longitudinally extending keyway 56 for slidably receiving a key fixed within a friction wheel 57 which may be moved, axially, longitudinally of the shaft. Secured, by screws 58, to lugs 59 formed with and extending radially inwardly from the inner periphery of the drum 38, is a drive ring 61 having in one face thereof an annular groove 62 in which is preferably cemented or otherwise secured an annulus 63 of rubber or other such resilient material. The friction wheel 57 is positioned to engage the surface of the annulus 63 to effect a driving connection therebetween. When the motor 52 is running rotation of the shaft 54 will rotate the friction wheel 57 and will thereby impart rotation to the drum 38 and the record 39.

Means is provided for varying the effective ratio between the motor and the drum so that the rotational speed of the latter may be adjustably varied while maintaining constant speed in the motor. The friction wheel 57 is provided with an axial extension 64 having therein a peripheral groove 66 and the bore of the wheel is provided with a plurality of axially spaced peripheral grooves 67. In a recess 68, drilled radially into the shaft 54, is a spring 69 which engages and presses a latch ball 71 into one of the grooves 67. It will be seen that if the friction wheel is moved axially along the shaft 54 the latch ball 71 will be engaged with successive of the grooves 67 thus positioning the friction wheel at different radial distances from the rotational center of the annulus 63 which will, of course, change the rotational ratio between the shaft 54 and the drum 38. It will of course be obvious that a greater number of positioning grooves 67 may be provided in the friction wheel 57 so that a larger range of speed changes is made possible; a fewer number being shown so as to simplify the drawings. Means is provided, extending exteriorly of the apparatus, for moving the friction wheel between selected positions. Formed in a boss 72, extending from the inner surface of the end plate 13, is a guide aperture 73 in which is slidably mounted a shift rod 74 having at its outer end a grip knob 76 and at its inner end, Figure 5, a hub 77 from which extends a radial arm 78 having at its extreme end a semi-circular yoke 79 which is curved complementarily to the peripheral groove 66 of the friction wheel extension 64. The length of the arm 78 is such that, when the grip knob 76 is rotated, the yoke 79 may be moved into engagement with the groove 66, as shown by the dotted lines 81 of Figure 5, or to a position out of engagement with the groove as shown by the solid lines of the aforementioned figure of the drawings. A plurality of axially spaced peripheral grooves 82, similar in number and spacing to the grooves 67 of the friction wheel, are provided in the shift rod 74 which are successively engageable with a spring pressed latch ball 83 which frictionally fixes both the axial and rotational positions of the shift rod. Thus the yoke 79 may be held out of engagement with the friction wheel at all times except when the drive ratio is being changed so that no unwanted vibrations will be transmitted from the supporting frame to the drum and the record. The vibrations transmitted through the motor 52 and the rotational drive will be negligible since the motor is resiliently mounted by the spring loop 46 and the drive connection between the friction wheel 57 and the drum 38 is through the resilient rubber annulus 63. While for purposes of simplicity in the drawings, the motor 52 has been shown as mounted on the leaf spring loop 46 it will be obvious that this mounting may be effected through a block of rubber or through any other known cushioning means without departing from the spirit of the invention.

Means is provided for varying the pressure of the friction wheel 57 against the surface of the annulus 63 so that different degrees of traction between the parts may be effected. Journaled in an aperture 84 in the end plate 13 is an adjustment shaft 86 fitted at its outer end with a rotating knob 87 and having a collar 88 secured thereto adjacent the inner surface of the end plate so that the shaft is restrained against axial movement but is free to be rotated. The extreme inner end of the shaft 86 is threaded to engage mating threads formed in a boss 89 formed integrally with one of the motor support bracket bars 16. Since, as was explained above, the motor is slidable axially together with its mounting in the elongated apertures 43 of the motor support bracket, it will be seen that by rotating the knob 87 the threaded connection between the shaft 86 and the motor support will cause the friction wheel 57 to be urged with more or less pressure against the face of the annulus 63 thus varying the degree of traction between the contacting parts.

Means is provided for inscribing a sound groove in the record 39, and means is also provided for permitting reproduction 33 of any portion of said sound recording either while a recording is in progress or as a separate operation

after the recording has been completed. As will be most clearly seen in Figure 1, a pair of cylindrical guide rods 91 and 92 are disposed in spaced relation overlying the drum and the record 39 and are each secured by nuts 93, in insulating bushings 94 provided in the end plate 13. The other end of each of the guide rods is secured by nuts 96 in a spacer bar 97 of insulating material, preferably Bakelite, adjacent the opposite end of the drum. Referring now to Figure 10, a metallic bushing 92 is mounted on and slidable along the guide rod 91 and is preferably pressed into an insulating sleeve 99. A pair of parallel frame plates 101 are secured to opposite ends of the insulating sleeve 99 and are, by the latter, electrically insulated from the guide rod 91. Pivotally mounted on a shaft 102, which has its opposite ends fixed in the respective frame plates 101, is an arm 103 having an enlarged weighted integral head 104. An electro-magnetically operated recording head 106 is provided having at one end of its armature a chuck 107 in which a suitable pointed stylus 108 may be secured by a setscrew 109. Extending from the recording head is a pair of lugs 111, which engage pivot pins 112 carried by the weighted head 104 so that the recording head is pivotally mounted on the head 104 and an additional pair of lugs 113 between which a bearing block 114 is pivotally mounted. Another pair of lugs 116 rises from the arm 103 between which a nut 117 is pivoted and an adjusting screw 118 having threads thereon, which engage mating threads formed in the bore of the pivoted nut 117, is provided at its end with a diametrically reduced shank 119 which is journaled in the bore of the pivoted bearing block 114. A collar 121, pinned to the end of the shank 119 and engaging the face of the bearing block 114, is for the purpose of retaining the shank in the bearing block. A knurled handwheel 122, which is pinned to the shaft 118, provides means facilitating rotation of the shaft. It will be seen that when the shaft 118 is rotated, it will be advanced axially thereby causing pivotal movement of the recording head 106 about the axis of the pivot pins 112. This causes the stylus 108 to assume different angular positions with respect to the surface of the record film 39. This angular setting of the stylus is quite important if clearly reproducing recordings are to be made. In order to regulate and maintain constant the depth that the stylus may inscribe the sound groove into the surface of the record, a setscrew 123 is provided in the arm 103 the lower end of which abuts against the insulating sleeve 99. It will be seen that by rotating the setscrew in opposite directions the entire arm 103 and consequently the point of the stylus 108 may be raised or lowered; thus limiting the depth that the weighted end 104 of the arm 103 may force the stylus into the surface of the record. It will also be seen that the arm 103 and the recording head may be pivotally moved about the axis of the pivot pin 102 so that the recording head may be lifted clear enough to allow inspection or replacement of the stylus.

Slidably mounted on the guide rod 92, is a metallic bushing 124 surrounded by an insulating sleeve 126. A pair of parallel frame plates 127 are secured to opposite ends of the insulating sleeve 126 and are also joined together by a metallic crossmember 128 and by a metallic bar 129 which is extended to form a handle 131. Both the cross-member 128 and the bar 129 may be welded or brazed to the frame plates 127 or attached in any other suitable manner. Pivotally mounted, by means of a pivot screw 132, on the cross member 128 is a swivel plate 133 having an integral pair of extension arms 134 fitted with pivot pins 136 upon which a reproducing head 137 is journaled. The head 137 contains a signal generator which may be either an electro-magnetic device, or a piezo crystal, actuated by vibrations picked up by the stylus 138 which is capable of tracking in the sound grooves created by the recorder stylus 108. The stylus 138, being held in the chuck 139 by the setscrew 141, may be removed for replacement. It will be observed that the pivots 132 and 136 provide a universal mounting for the reproducing head 137 so that it is free to move in any direction to follow irregularities in the surface of the record film 39.

Means is provided, common to both the recording and reproducing heads for advancing the heads at a predetermined rate axially of the drum 38 so that the stylus 108 of the recording head may inscribe a helical sound groove of uniform pitch in the record film 39, and the stylus 138 of the reproducing head will track correctly in the groove without causing any undue wear on the sides of the latter. Positioned for rotation intermediate and paralleling the guide rods 91 and 92 is a threaded lead screw 142 one end of which is provided with a shank 143 journaled in a metallic bushing 144 secured in an aperture, formed in the spacer bar 97, by a nut 146, and the other end of which is provided with a longer shank 147 journaled in and extending beyond a bushing 148 preferably pressed into an aperture provided in the end plate 13. Referring again to Figure 10, it will be seen that the frame plates 101, of the recording head mounting, are each extended to positions overlying the leadscrew 142 and are integrally connected with a quarter-nut 149 which is provided with threads mating with those of the leadscrew. When the quarter-nut 149 is in mesh with the threads of the leadscrew, and the latter is rotated, it will be seen that the recording head and its mounting will be moved axially along the guide rod 91 at a rate dependent upon the pitch of the threads of the leadscrew and the latter's speed of rotation. The bar 129, associated with the reproducing head mounting, is provided with an extension 151 upon which is securely mounted a fractional nut 152 similar to the quarter-nut 149, and provided with threads matching and engageable with those of the leadscrew so that upon rotation of the latter the reproducing head and its mounting may be advanced axially of the guide rod 92 at a rate equalling the rate of travel of the recording head. It may be noted here that the construction of the nuts, which drive the recording and reproducing heads, allows the heads to be shifted past and without interference from each other and also allows the reproducing stylus 138 to track in the sound groove closely adjacent to the recording stylus 108. This permits practically immediate playback of the sound groove as it is being recorded, there being actually, as will be seen in Figure 10, only a small fraction of a second difference between the time that the point of contact of the recording stylus with the sound groove reaches the reproducing stylus.

Means is provided connecting the leadscrew

with, and for rotation by, the motor 52 so that the rotation of the leadscrew will be synchronized with that of the drum 38 and the record film 39. Referring to Figure 3, it will be seen that the tubular stub shaft 18 is fitted at one end with a plain bushing 153 and at the other end with a bushing 154 having a peripheral flange 156 which, in contacting an end of the sleeve 27, acts as a thrust bearing to absorb the thrust of the friction wheel 57 against the face of the rubber annulus 63. The bearings 153 and 154 also serve as journals for a shaft 157 which, at one end, is fitted with a collar 158, retained on the shaft by a setscrew 159, provided with a radial arm 161 terminating in an angularly directed stem 162 which is seated in a drilled recess 163 formed in the hub 29 of one of the drum-supporting spiders. Fixed to the opposite end of the shaft 157 is a pinion 164. An intermediate shaft 166, at one end passes through and extends beyond a journal provided therefor in the end plate 13, and, at the other end, is journaled in an aperture formed in a wing extension 167 of one of the bars 16 forming the support 17. A gear 168 fixedly mounted on the said other end of the shaft 166, is in mesh with the pinion 164. A sprocket 169, fixed to the end of the shaft 166, which extends beyond the outer face of the end plate 13, is in mesh with an endless chain 171 which also meshes with another sprocket 172 secured, by means of a setscrew 173, on the shank 147 of the leadscrew 142. It will be seen that, when the drum 38 is rotated by the motor 52, the connection of the shaft 157 with the drum spider through the arm 161 will effect rotation of the shaft 157 thus imparting, through the gears 164 and 168, rotation to the intermediate shaft 166, and to the leadscrew 142 through the sprockets 169 and 172 through the chain 171. It will be seen that, since the rotational ratio between the drum and the shaft 157 is unity, the only manner in which the ratio of rotation between the drum and the leadscrew 142 may be altered, to provide a greater or lesser spacing of the helical sound groove on the record film, is by changing the ratio of the gears 164 and 168 or by making one of the sprockets 169 or 172 larger than the other. The arrangement and proportions shown in the drawings give quite satisfactory results; the drum being rotated at a speed of about 8 R. P. M. which gives the 30 thread per inch leadscrew a rotational speed of 1.6 R. P. M. thereby producing a sound groove having 150 convolutions to the inch or a linear pitch of .006." It will of course be understood that the proportions given above are purely exemplary since, when a signal of extraordinary volume is used to actuate the recording head, a coarser spacing between adjacent convolutions of the sound groove is necessary in order to prevent lateral overlapping or relative distortion of the convolutions.

Means is provided which permits selective raising or lowering of either the recording head or the reproducing head so that either one, or both, may be rendered active or inactive as desired to allow for recording alone, reproduction alone, or simultaneous recording and reproduction. Disposed in spaced parallel relation to the guide rod 91 and journaled at its ends, respectively, in the end plate 13 and the spacer bar 97, is a shaft 174 keyed to the end of which, adjacent the spacer bar and as is best shown in Figure 8, is a hub 176 carrying an arm 177 extending transversely over the guide rod 91 and the leadscrew 142 and terminating in an eye 178 in which is secured one end of a lift rod 179 which extends in spaced parallel relation to the leadscrew. To the other end of the shaft 174, adjacent the end plate 13 and as is best shown in Figure 9, is secured, by a key 181, a hub 182 having extending therefrom, and projecting beyond the forward edge of the end plate, a lever 183 having rising therefrom, intermediate its ends, a stem 184 which has a terminal eye 186 in which the other end of the lift rod 179 is secured. Referring now to Figure 10, it will be seen that the lift rod 179 passes through elongated apertures formed in extensions 188 of the recording head frame plates 101 so that the lift rod is operatively connected with the recording head mounting. It will be seen that upon lifting the projecting handle 189 of the lever 183 the shaft 174 will be rotated thereby causing elevation of the lift rod 179 and rotary movement of the entire recording head mounting about its pivotal axis, which is the axis of the guide rod 91, so as to disengage the quarter-nut 149 from the leadscrew 142. As shown in Figure 1, an aperture is formed in the lever 183, just inside of the edge of the end plate 13, into which is pressed a sleeve 191 containing a spring 192 which urges a latch ball 183 into one of a pair of depressions 194, best indicated in Figure 4. By means of this construction the recording head may be releasably maintained in elevated and inoperative position as shown in Figure 11. Returning again to Figure 10, it will be seen that a drilled hole 196, passing through the bar 129, the insulating sleeve 126 and the metallic bushing 124, is provided which axially intersects the axis of the guide rod 92. Slidably mounted in the hold 196 is a cylindrical latch pin 197, constructed of insulating material such as Bakelite or the like wear-resisting material, having a rounded lower end which may engage in a shallow groove 198 formed in and extending axially along the surface of the guide rod 92. A leaf spring 199 secured by screws 201 to the bar 129 bears against the upper end of the latch pin 197 so as to resiliently urge the latter into engagement with the groove 198. It will be seen, from Figure 10, that when the reproducing head 137 is in its lowered or operative position, the latch pin 196 will be rotationally offset with respect to the groove 198 and that, as seen in Figure 11, when the handle 131 is lifted the latch pin will be moved into alinement with the groove and will snap thereinto, urged by the spring 199, to hold the reproducing head mounting in elevated position until released. In order to cause the horizontally pivoted reproducing head to follow its mounting, when the latter is elevated, so that the stylus 138 will be held clear of the record film 39, a support spring 202, secured by one or more screws 203 to the reproducing head, is provided which engages the swivel plate 133 as the reproducing head mounting is lifted, as seen in Figure 11, so as to limit the downward movement of the head about the axis of the pivots 130.

It will be noted that the guide rods 91 and 92 are each completely electrically insulated from the majority of the metallic parts of the apparatus by means of the insulating bushings 94, the insulating spacer bar 97, and the respective insulating sleeves 99 and 126. This is done so as to utilize the guide rods 91 and 92 as current conductors for supplying the recording head with sound modulated actuating current and for conveying the generated sound translation current from the reproducing head. As will be clearly seen in Figure 7, one terminal of the actuating coil 204 of the recording head is connected by

a short lead 206 with the metallic bushing 98 which slidably contacts the guide rod 91, and the other terminal of the coil is connected by a lead 207 with the recording head mounting or the quarter-nut 149 which releasably engages the leadscrew 142. One terminal of the reproducing current generator which, for convenience, has been indicated as a coil 208, is connected by a lead 209 with the metallic bushing 124, which is in slidable contact with the guide rod 92, and the other terminal thereof is connected, by a lead 211 with the reproducer head mounting or fractional nut 152. A recording amplifier 212 which is fed from a microphone, or other such input device 213, has one output lead 214 connected with the guide rod 91, and an output amplifier 216 which drives a loudspeaker 217, or similar translation device, has one input lead 218 connected with the guide rod 92. The other output lead 219 of the recording amplifier and the other input lead 221 are joined and connected by a common lead 222 with the main body of the apparatus, which includes the leadscrew 142, and which is indicated as being at ground potential. It will be seen that by utilizing the guide rods as feed conductors and the leadscrew as a common return conductor, the circuits to and from the recording and reproducing heads may be maintained without the use of long flexible jumper wires which would always be in the way, detract from the appearance of the apparatus and, due to frequent flexing, be likely to crystallize and break. It will also be noted that, upon lifting either the recording head handle 189 or the reproducing head handle 131, the movement of the respective heads axially of the platen 38 is not only stopped but also the electric circuits to the respective heads is interrupted as soon as the fractional nuts 149 and 152 disengage the leadscrew 142.

As an additional feature of construction a panel 223 of insulating material is secured to one of the angle bars 14 and extends longitudinally of the drum 38. This panel affords partial protection to the record film against being accidently struck and damaged by articles resting upon the surface upon which the base plate 12 may be supported, but principally provides a mounting for controls such as volume controls, for the input of the recording amplifier and the output of the reproducing amplifier, monitoring jacks, switches and the like. The upper edge of the panel may conveniently be marked off as a scale so that various portions of the sound record may be measured and conveniently located.

Having thus described the invention in detail, what is claimed as new and desired to be secured by Letters Patent is:

1. In a sound recording apparatus having a rotatable record drum, power means within and for rotating said record drum, a fixed guide bar extending along and in spaced relation to said record drum, a rotatable feed screw paralleling said guide bar and electrically insulated therefrom, means connecting said feed screw to be driven by said record drum rotating means, an electrical translating device mounted on said guide bar and connected to be moved along said guide bar by said feed screw, said electric translation device having insulated current terminals connected respectively with said guide bar and said feed screw, and utilization circuits connected, respectively, with said guide bar and said feed screw.

2. In a sound recording apparatus having a rotatable record drum, power means within and for rotating said record drum, a fixed guide bar extending along and in spaced relation to said record drum, said guide bar having a surface groove extending longitudinally thereof, a rotatable feed screw paralleling said guide bar and electrically insulated therefrom, means connecting said feed screw to be rotated by said record drum rotating means, a carrier mounted on said guide bar for rotary and longitudinal movements with respect thereto, said carrier having thereon a segmental threaded nut which may be brought into engagement with said feed screw upon rotational movement of the carrier so as to connect the carrier to be driven along the guide bar by and upon rotation of the feed screw, an electric translation device mounted on said carrier and adapted to be operatively positioned with respect to said record drum when the segmental nut of the carrier is engaged with the feed screw, said translation device having a pair of terminals which are relatively electrically insulated, means connecting said terminals, respectively, with said guide bar and said feed screw, utilization circuits connected, respectively, with said guide bar and said feed screw, and a spring-pressed latch element engageable, when said carrier is rotatably moved on said guide bar so as to elevate said electric translation device from its operative position with respect to the record drum, in the groove of said guide bar so as to releasably maintain said translation device in its elevated position.

3. In a sound recording apparatus having a rotatable record drum, power means within and for rotating said record drum, a fixed guide bar extending along and in spaced relation to said record drum, said guide bar having a surface groove extending longitudinally thereof, a rotatable feed screw paralleling said guide bar and electrically insulated therefrom, means connecting said feed screw to be rotated by said record drum rotating means, a carrier mounted on said guide bar for rotary and longitudinal movements with respect thereto, said carrier having thereon a segmental threaded nut which may be brought into engagement with said feed screw upon rotational movement of the carrier so as to connect the carrier to be driven along the guide bar by and upon rotation of the feed screw, an electric translation device mounted on said carrier for pivotal movement relative to the carrier in both horizontal and vertical planes and adapted to be operatively positioned with respect to said record drum when the segmental nut of the carrier is engaged with the feed screw, said translation device having a pair of terminals which are relatively electrically insulated, means connecting said terminals, respectively, with said guide bar and said feed screw, utilization circuits connected, respectively, with said guide bar and said feed screw, and a spring-pressed latch element engageable, when said carrier is rotatably moved on said guide bar so as to elevate said electric translation device from its operative position with respect to the record drum, in the groove of said guide bar so as to releasably maintain said translation device in its elevated position.

4. In a sound recording apparatus having a rotatable record drum, power means within and for rotating said record drum, a fixed guide bar extending along and in spaced relation to said record drum, a rotatable feed screw paralleling

said guide bar, a carrier slidably mounted on said guide bar and engaged with said feed screw so as to be relatively fixed with respect to the record drum and to be moved by the feed screw, as the latter is rotated, along the guide bar, a weighted arm pivotally mounted for movement in a vertical plane on said carrier, means for adjustably raising and lowering said weighted arm relative to said carrier, an electrical translation device pivotally mounted for movement in a vertical plane on said weighted arm and positioned in operative relationship with respect to said record drum, and means for raising and lowering said electrical translation device relative to said weighted arm so as to vary the operative relationship between said translation device and said record drum.

5. In a sound recording apparatus having a rotatable record drum, power means within and for rotating said record drum, a fixed guide bar extending along and in spaced relation to said record drum, said guide bar having an integral latch element extending longitudinally thereof, a rotatable feed screw paralleling said guide bar and electrically insulated therefrom, means connecting said feed screw to be rotated by said record drum rotating means, a carrier mounted on said guide bar for rotary and longitudinal movements with respect thereto, said carrier having thereon clutching means which may be brought into tractional engagement with the feed screw, upon rotational movement of the carrier, so as to connect the carrier to be moved along the guide bar and upon rotation of the feed screw, an electric translation device mounted on said carrier and adapted to be operatively positioned with respect to said record drum when said carrier clutching means is tractionally engaged with said feed screw, said translation device having a pair of terminals which are relatively electrically insulated, means connecting said terminals, respectively with said guide bar and said feed screw, utilization circuits connected, respectively, with said guide bar and said feed screw, and a pressure-actuated latch member engageable, when said carrier is rotatably moved on said guide bar so as to elevate said electric translation device from its operative position with respect to the record drum, with said latch element of the guide bar so as to releasably maintain said translation device in its elevated position although permitting free movement of said translation device along said guide bar longitudinally of said record drum.

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