

Jan. 12, 1937.

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2,067,347

RECORDING AND REPRODUCING DEVICE

Original Filed Feb. 25, 1935

4 Sheets-Sheet 1

Fig. 1

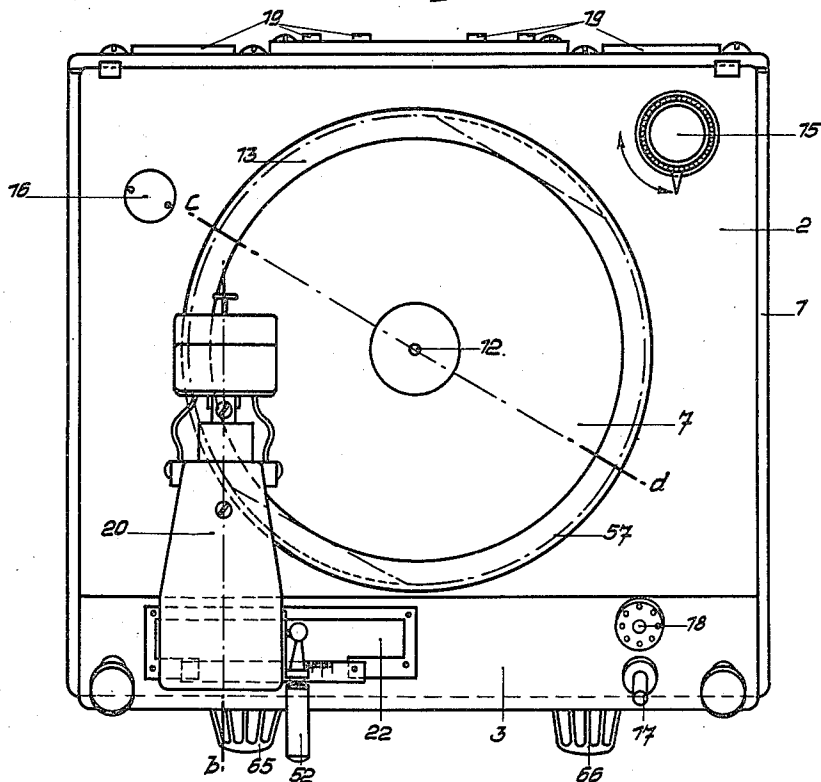
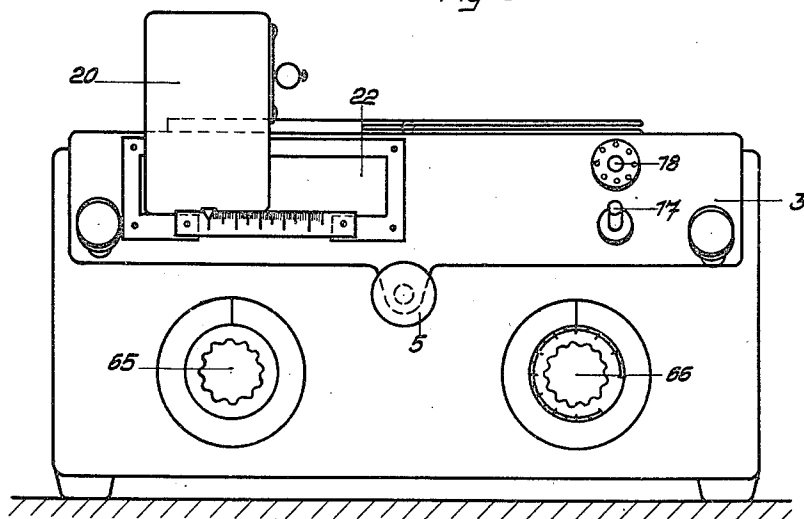


Fig. 3



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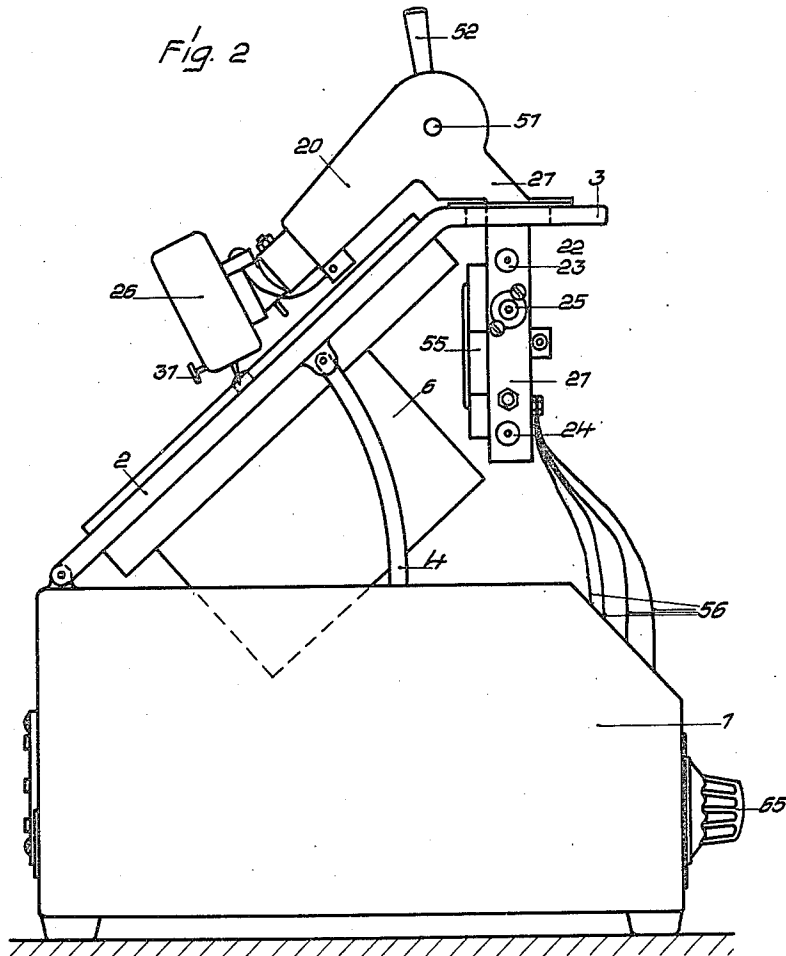
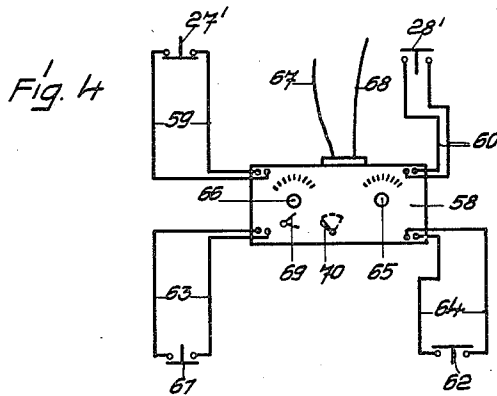
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Fig. 5

Fig. 6

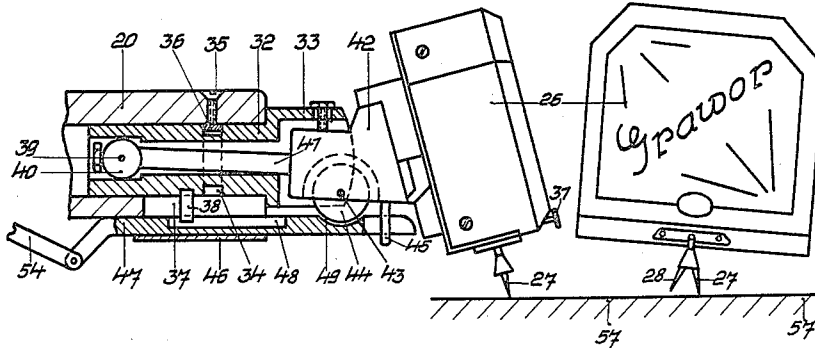


Fig. 7

Fig. 8

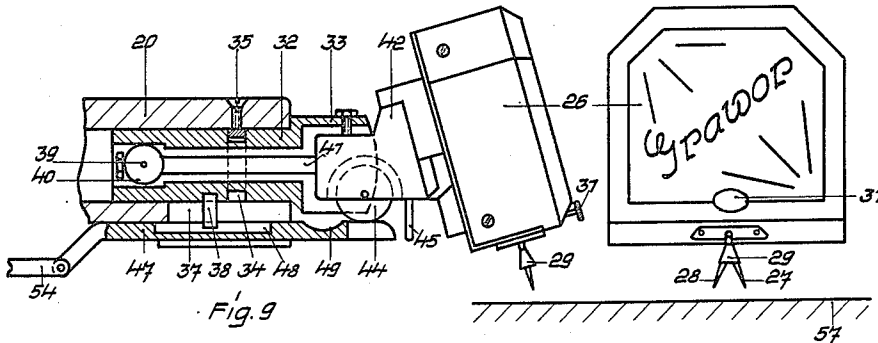


Fig. 9

Fig. 11

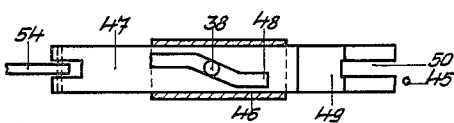
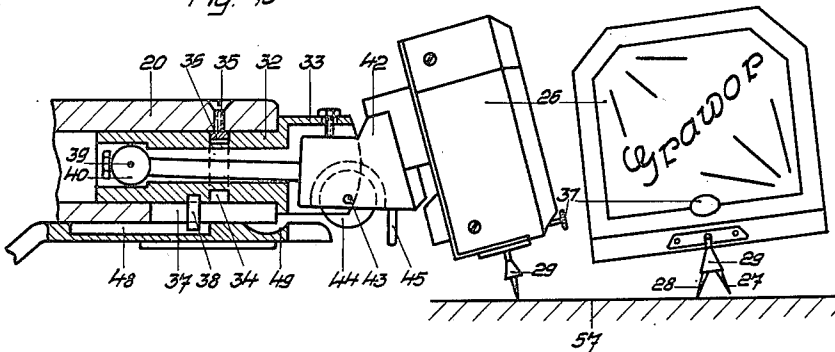


Fig. 10



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Fig. 12

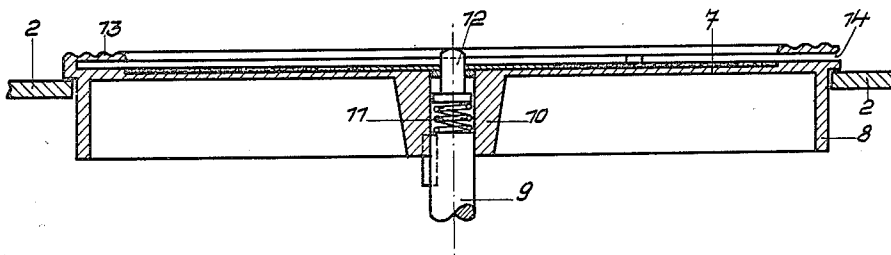


Fig. 14

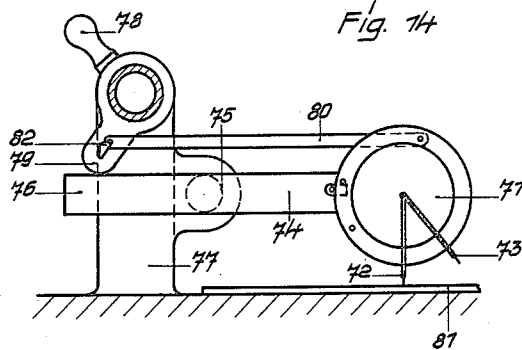
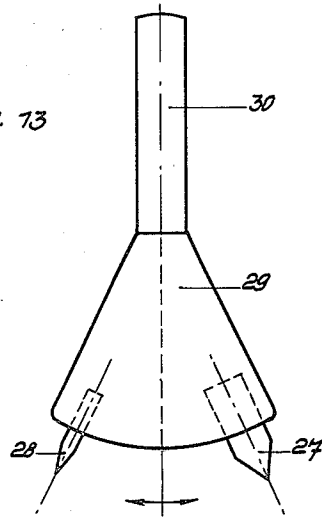


Fig. 13



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UNITED STATES PATENT OFFICE

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RECORDING AND REPRODUCING DEVICE

Arno Rysick, Dresden, Germany

Application February 25, 1935, Serial No. 8,093.

Renewed June 22, 1936. In Switzerland September 29, 1934

10 Claims. (Cl. 179—100.4)

This invention relates to a disc recording and reproducing device adapted for both acoustic and electric sound transmission.

Compared with existing devices, the invention provides an extraordinarily simple design, as the device can be adjusted to recording or reproducing by the actuation of a single operating lever.

The invention employs a turntable and a carrier disposed on a guide and provided with a combination recording and reproducing tool connected by suitable transmission means with a sound recorder and a sound reproducer and actuated by a common drive with an interposed starting and stopping device, the recording and reproducing function of the combination tool being alternately controlled by a change-over means.

In case of electric sound transmission, the recording instrument is preferably connected with a microphone and the reproducing instrument with a loud speaker, whereas during acoustic transmission of sound a sound inlet and outlet piping is, respectively, provided for the recorder and reproducer. It is further possible to interpose an amplifier between the microphone or reproducer and the loud speaker.

Particularly advantageous is the construction of the recorder and reproducer which, according to the invention, comprises a sound box provided at its lower end with a needlelike member carrying a recording pin and a reproducing pin. When passing into end position the change-over member of the device raises or lowers the carrier with the recorder and reproducer by means of a cam relative to the disc, and at central position of the change-over member the recorder and reproducer are controlled by a cam drive and levers so as to bring either the recorder or the reproducer upon the disc.

If the sound is transmitted electrically, the change-over member serves also as switch for the electric circuit, so that, during recording, the microphone is connected with the recorder and, during reproduction, the reproducer with the loud speaker.

By way of example, the invention is illustrated in the accompanying drawings, in which Figure 1 is a top view of the device; Fig. 2, a side view thereof, with the covering plate carrying the turntable and the drive turned up; Fig. 3, a front view of the device; Fig. 4, a wiring diagram; Figs. 5, 7 and 10 are sections on the line *a—b* of Fig. 1, with the parts in different positions; Figs. 6, 8 and 11 are front views of Figs. 5, 7 and 10 seen from the side of the sound box; Fig. 9 is a detail

view of Fig. 7; Fig. 12 is a section of the turntable on the line *c—d*; Fig. 13 is a view of the needle carrying the recording and reproducing pin; and Fig. 14 is a side view of an acoustic recording and reproducing device.

Referring to the drawings, the boxlike lower part 1 of the casing carries on top a movable covering plate 2 provided at its front edge with a bent portion 3, the form of the casing making allowance for this bent part. 4 is a stay which when the plate 2 is turned up snaps into a notch to insure the adjustment of the parts as per Fig. 2. When the stay 4 is lifted out of the notch, the covering plate can be lowered and secured to the casing 1 by the set screw 5, shown in Fig. 3. On its underside the plate 2 carries the turntable driving motor 6 and other mechanisms, whereas in a suitable recess on the top side of plate 2 the turntable 7 is disposed and possesses a driving edge 8 of corresponding width, which extends into the casing 1, as indicated in Fig. 12. 9 is the driving shaft of the turntable, which engages the boss 10 and above which, by means of an interposed compression spring 11, the centering bolt 12 is cushioned. Slightly above the turntable 7 a holding edge 13 open at one end is provided with a slot 14 for inserting the disc. When a disc is inserted the centering bolt 12 is to be depressed against the action of the spring 11. The disc 15 is somewhat flattened at the sides to permit insertion in the slot 14 and being driven by the turntable 7. Dots and dashes in Fig. 1 indicate the outline of an inserted disc.

The turntable 7 is driven by means cooperating with the edge 8 and being not shown. 15 is a switch for running the turntable 7 at two different speeds. Furthermore, the plate 2 is provided with an oil inlet funnel 16 connected by pipings with all parts of the device that require lubrication. The portion 3 of the covering plate 2 carries a switch 17 for throwing the driving motor into circuit. 18 is a control lamp which indicates the closing of the circuit. The rear of the casing 1 is provided with connecting contacts 19 for connecting conductors. Inside the casing 1 a feed spindle with suitable drive is provided for moving the recorder or reproducer consisting of a hooklike carrier 20, as shown in Fig. 2, the lower part 21 of which passes through a perforation 22 of the part 3 and is guided on the shafts 23 and 24. 25 is the feed spindle which causes reciprocating motion of the recorder or reproducer. At the front end of the carrier 20 the sound box or pick up 26 is arranged which carries the recording pin 27 or the reproducing pin 28, both pins being

firmly or interchangeably disposed in a support 29 which can be inserted in the sound box 26 by means of a needlelike member 30 and secured therein by a set screw 31.

5 In describing the recorder and reproducer, reference is had to Figs. 5 to 11.

Inside the carrier 20 a hollow box 32 is provided at its front end with an open head 33, the box 32 having further a groove 34 and being rotatable in the carrier 20. A screw 35 secured in the carrier 20 holds a wedge 36 inserted in the groove 34 to prevent motion of the box or sleeve 32 in axial direction. On its underside the carrier 20 has a recess 37 engaged by a pin 38 disposed in the sleeve 32. Inside the sleeve 32 a carrying rod 41 is arranged on a shaft 39 by means of a ball joint 40 and fitted at its front end with a holding head 42 for the sound box 26. In the lower portion of the holding head 42 a shaft 43 carries a rotatable roll 44. The head 42 further carries a guide pin 45.

On the underside of the carrier 20 a guide member 46 is secured, in which a control slide 47 moves, a top view of which is shown in Fig. 9. On its side facing the sleeve 32 the slide 47 has a groove 48 which is engaged by the guide pin 38 of the sleeve 32. At its front end projecting beyond the guide member 46 the slide 47 is provided with a recess 49 and a slot 50.

30 In the carrier 20, as indicated in Fig. 2, a shaft 51 is disposed which at one end carries the control lever 52 and which engages inside the carrier 20 the slide 47 by means of the lever 53 and the link 54. Simultaneously, the shaft 51, by means of rods not shown, actuates the nut of the feed spindle, which also is not shown, and the electric switch 55 connected to the various connecting points by the conductors 56. When the control lever 52 has been turned down, the parts are in the position shown in Figs. 5 and 6. The slide 47 is in foremost position with the roll 44 in the recess 49 thereof, so that the carrier 41, 42 for the sound box 26 can drop down and the recording pin 27 rest on the disc 57, the guide pin 38 being in the rear portion of the groove 48, so that the sleeve 32 is turned in the carrier 20 and the sound box is in the slanting position indicated in Fig. 6. The slide 47 further embraces with the guide slot 50 the guide pin 45 on the holding head 42 for the sound box 26 to secure the latter against troublesome motion.

To effect a change from recording to reproducing the control lever 52 is brought into central position, the lever 53 moving clockwise and drawing the slide 47 into the position according to Fig. 7. The roll 44 is lifted out of the recess 49 and moved to the raised part of the slide 47 while the sound box 26 is lifted off from the plate 57. Simultaneously, the groove 48 of the slide 47 passes along the guide pin 38 and, owing to its shape, causes a displacement of the sleeve 32. The sound box 26 is now in the position shown in Fig. 8. It is known that the changing of the sound box from one end position to another is effected only in lifted-off condition and that the lifting from and return to the disc are carried out in vertical direction.

When the control lever 52 is moved farther in the same direction, the parts will be in the position shown in Fig. 10, i. e., the slide 47 has completely released the roll 44, so that the sound box can move down again. Previously, however, the groove 48 has caused complete motion of the guide sleeve 32 into its other end position, so that at normal placing of the sound box 26 the repro-

ducing pin 28 meets the disc 57 in the manner shown in Fig. 11. During actuation of the switch 52 all other necessary control motions have been carried out also, i. e., the microphone, loud speaker, amplifier, etc. have been changed over also.

Fig. 4 shows a diagram of connections for the electric operation of the device and electric transmission of sound. The amplifier 38 is connected by the conductors 59 to the recording means 27' and by the conductors 60 to the reproducing means 28'. 61 is a microphone and 62 a loud speaker or a receiver. The members 61 and 62 are connected to the amplifier 58 by means of the conductors 63 and 64. 65 and 66 are knobs for regulating the recording or reproducing intensity, as indicated in Figs. 1 to 3. The amplifier 58 is connected by a conductor 67 to a source of current. The conductor 68 feeds the driving motor for the turntable. A switch 69 serves for interrupting the circuit, and the switch 70 arranged on the amplifier, as indicated in Fig. 4, or on the recorder or reproducer can change the entire device from recording to reproduction and vice versa.

The device described with reference to Figs. 1 to 11 relies on electric sound transmission, but acoustic transmission is equally possible. In this case the device could be constructed as diagrammatically shown in Fig. 14 where a diaphragm sound box 71 is used which is provided with a recording pin 72 and a reproducing pin 73. The sound box 71 is attached to a tone arm 74 which can swing about the shaft 75 and carries a lengthening member 76. The shaft 75 is disposed in a bearing 77 which at its top end carries a control member 78 for influencing a cam 79 co-operating with the lengthened end 76 of the tone arm 74 and connected with the sound box 71 by a rod 80 in such a way that at the actuation of the control member 78 the cam 79 presses upon the tone arm whereby the sound box 71 is lifted off vertically from the plate 81. Then a cam path 82 worked into the cam 79 becomes effective, by means of which during further motion of the cam 79 the rod 80 is displaced, so that the sound box 71 in its raised position is moved also. During the following putting down motion the pin 73 will strike the disc 81. To the end 76 of the tone arm 74 a sound supplying tube or similar acoustically acting sound transmission members may be connected. It is also possible to let several turntables simultaneously work side by side and to provide a recorder or reproducer for each of them, so that the turntables may operate for instance successively and one disc constitutes the continuation of the preceding one, or all discs may work at the same time to produce discs which are copies of one another. There are numerous variations possible without deviating from the spirit and scope of the invention.

I claim:—

1. A disc recording and reproducing device, comprising a casing, a turntable arranged on said casing, a guide in said casing, a carrier on said guide, a recording and reproducing tool disposed above said turntable on said carrier, a sound recorder, a sound reproducer, transmission members for connecting said sound recorder and sound reproducer with said recording and reproducing tool, a motor for driving said turntable and said carrier for the recording and reproducing tool, a starting and stopping device disposed between the motor and the turntable, and a

change-over device for alternately starting the recording or the reproducing tool.

2. In a device according to claim 1 a microphone connected to the recording tool and a loud speaker connected to the reproducing tool.

3. In a device according to claim 1 transmission means constructed as acoustic sound inlet and outlet members.

4. In a device according to claim 1 a cam control for the change-over device, said cam control being adapted to raise and lower the recording and reproducing tool relative to the turntable, and a cam drive cooperating with the cam control for swinging the raised recording and reproducing tool during the change-over step into one or the other position.

5. A device according to claim 1, in which the change-over device is movably disposed in the carrier for the recording and reproducing tool and the carrier is lengthened beyond its bearing point, in which, further, a camlike projection cooperating with the lengthened portion of the carrier is provided on the change-over device and

also a curved surface in said camlike projection and a link rod engaging the curved surface for connecting the camlike projection with the recording and reproducing tool.

6. A device according to claim 1, in which the change-over device is simultaneously constructed as switch for the electric circuit.

7. In a device according to claim 1 means in the carrier for interchangeably receiving the recording and reproducing tools.

8. In a device according to claim 1 an edge on the turntable and a slot between the edge and the turntable for inserting the disc.

9. In a device according to claim 1 an edge on the turntable, a slot between the edge and the turntable for inserting the disc, a cushioned centering bolt in the center of the turntable and means for withdrawing the centering bolt below the surface of the turntable.

10. In a device according to claim 1 a frame articulated to the turntable and adapted to be turned up to insert the disc.

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