June 29, 1943. A. MAY 2,323,066

APPARATUS FOR THE PICKING UP AND REPRODUCTION OF SOUND

Filed Oct. 23, 1940 2 Sheets-Sheet 1

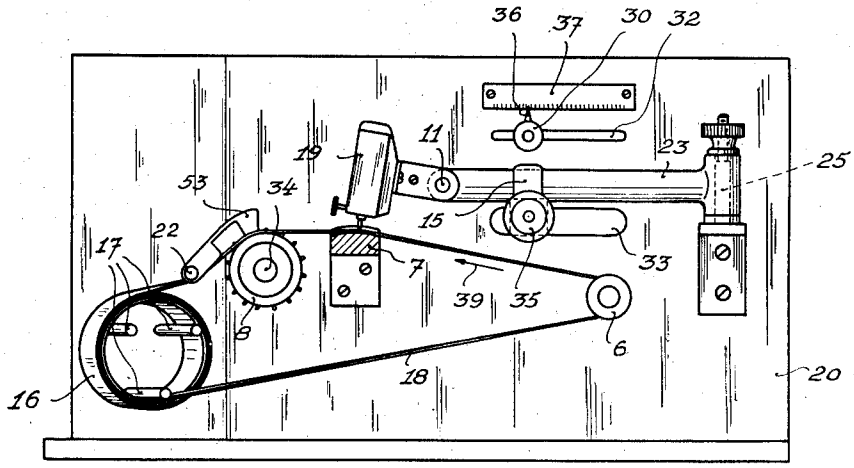


Fig. 1.

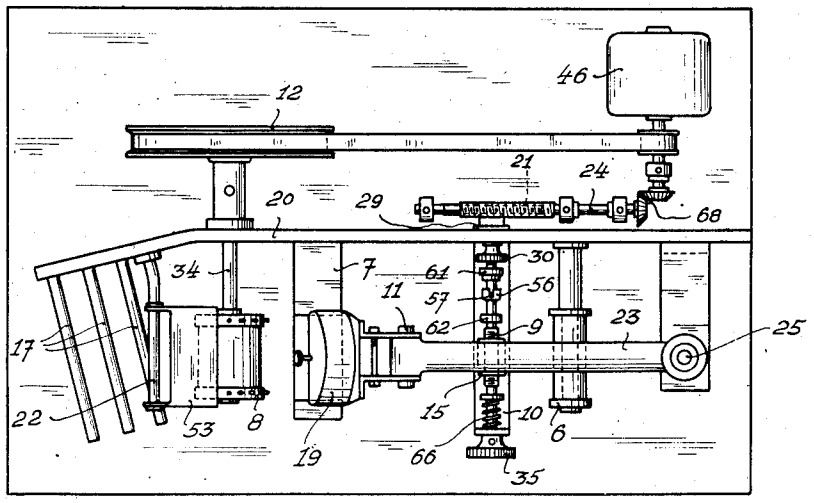


Fig. 2.

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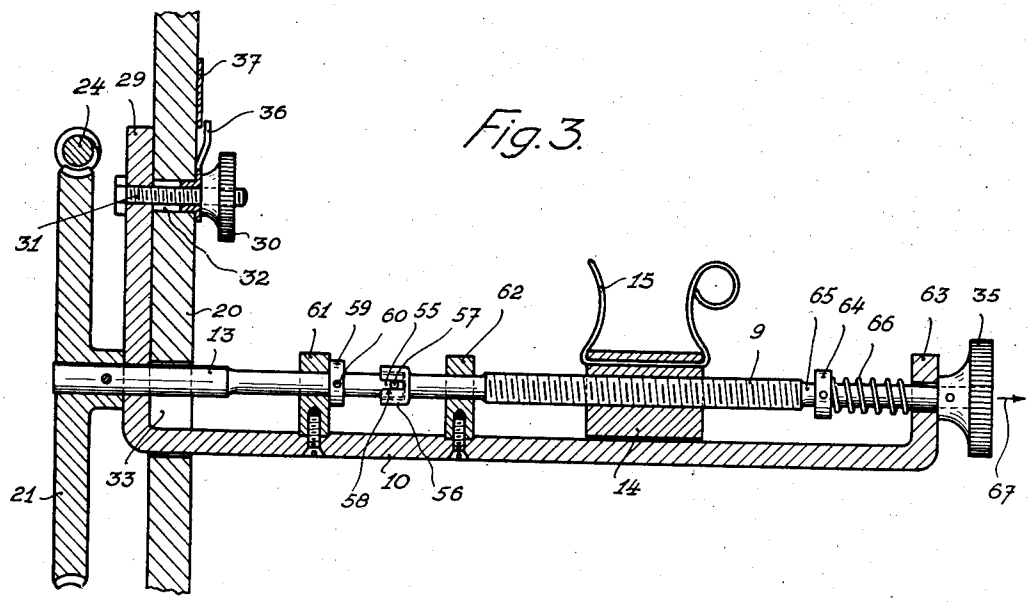


Fig. 3.

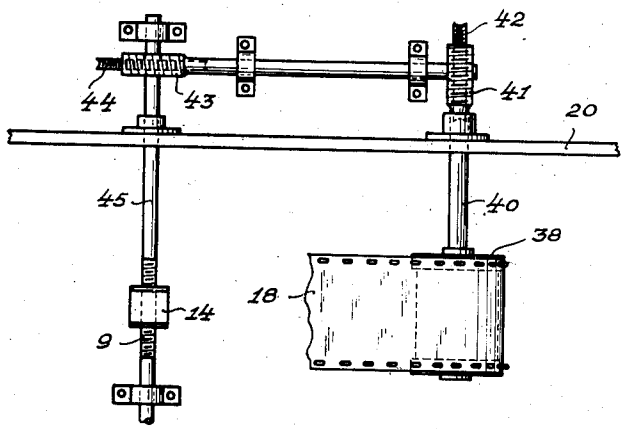


Fig. 4.

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UNITED STATES PATENT OFFICE

2,323,066

APPARATUS FOR THE PICKING UP AND REPRODUCTION OF SOUNDS

Alajos May, Szekesfehervar, Hungary; vested in the Alien Property Custodian

Application October 23, 1940, Serial No. 362,436
In Hungary October 24, 1939

3 Claims. (Cl. 274—11)

The invention relates to apparatus for the picking-up and reproduction of sounds, in which a ribbon-shaped endless sound trace carrier is employed, the sound trace being registered on the said sound trace carrier mechanically, e. g., by incision by means of a needle.

According to the invention a loose coil formed by the ribbon-shaped sound trace carrier is provided on at least one point of the path of travel of the endless sound trace carrier, the sound trace carrier becoming wound-up on the outermost turn of the said coil and being drawn-off from the innermost turn.

This method of guiding the sound trace carrier ensures the substantial advantage of enabling sound trace carriers of practically unlimited length to be employed in a set for the picking-up and reproduction of sounds which possesses the usual dimensions. Another advantage obtained by this arrangement as compared to the arrangements known up to now which comprise an endless sound trace carrier and in which the sound trace carrier ribbon forms a simple loop, is that sound trace carriers of greatly differing lengths may be employed in the same set.

Observation revealed the surprising fact that the smooth and uniform running of the sound trace carrier is not influenced by the loose coil formed in its path of travel. It is particularly in those cases that the unhindered winding-up and unwinding of the sound trace carrier as well as its quiet running can be assured in a satisfactory manner, in which that surface or those surfaces of the supporting member which are supporting the turns of the sound trace carrier are situated in an inclined position relatively to the path of travel of the sound trace carrier, i. e., obliquely, particularly if the said supporting member is inclined towards the interior of the loop, i. e., in the direction of the section of ribbon leaving the coil.

The guiding according to the invention of the sound trace carrier enables lengths of ribbon of 1 to 10 metres and even ribbons of substantially greater length to be employed without any difficulty, which fact will in case of the employment of a ribbon of 25 mm. width render possible an uninterrupted picking-up or reproduction of 2 to 3 minutes per metre.

By way of sound trace carrier it is preferable to employ ordinary cinema film, the sound trace being cut into the rear face, devoid of emulsion, of the film.

In order to enable, in the case of the ribbon guiding according to the invention, sound trace carriers of different lengths to be cut on the same set of pick-up and reproduction apparatus, the sound-box (pick-up) employed for cutting, is, according to the invention, being displaced by a special device, at a velocity amenable to control, transversely to the direction of travel of the sound trace carrier.

Further details of the invention will be explained with reference to the drawings showing two embodiments of the device for the picking-up and reproduction of sounds.

Fig. 1 is a front elevation,

Fig. 2 a plan view of one embodiment of the apparatus for the picking-up and reproduction of sounds,

Fig. 3 is a section drawn to a greater scale through the driving gear of the pick-up in the case of the apparatus according to Figs. 1 to 2,

Fig. 4 is a plan view of another embodiment of this driving gear.

In the case of the embodiment according to Figs. 1 and 2, 18 is the sound carrier film and 8 is the toothed drum, driven by the motor 46 through the shaft 34 and the flywheel 12 and effecting the propulsion of the sound trace carrier. The sound is picked-up by the sound carrier above the support 7 by means of the pick-up 19. On the sound carrier glides a filing collector brush 53 which is pivotable around the pivot 22 and which occupies the position shown on Figs. 1 and 2 only when cutting the sound trace, whereas during sound reproduction it is swung out from this position. Behind this brush the sound trace carrier 18 forms a loose coil 16 which is wound around the three rung-like fingers 17. These rungs are inclined relatively to the plane determined by those sections of the sound trace carrier which are running along straight-lined paths, the fingers being inclined in the direction of that section of the sound trace carrier which is running-off from the coil 16. The sound trace carrier running-off from the roller 8 becomes wound on the outermost turn of the coil 16 and is again being drawn-off from the interior of the coil 16. Following this the sound trace carrier 18 passes to the deflecting roller 6 and following that again to the support 7.

The pick-up 19 comprises, as usual, an arm 23 pivotable around the pivot 25. On the arm 23 the pick-up 19 is arranged so as to be pivotable around the joint 11, the arrangement being such as to enable the pick-up to move in a direction perpendicular on the surface of the sound trace carrier. The arm 23 of the pick-up is supported in a guiding member 14, the resilient wings 15 of

which are supporting the arm 23 from both sides. The guiding member 14 is constructed as a screw-nut and travels along the screw-spindle 9, the guiding member 14 being prevented from rotating by the arm 10 which latter finds support on the lower flat surface of the guiding member 14. It is by means of a coupling composed of the parts 55 and 56, that the spindle 9 is connected with the shaft 13, a wormwheel 21 being fixed on that end of this shaft which is situated behind the board 20. The coupling part 55 carries a pivot 57 which in the operative position of the coupling engages into the recess 58 of the other coupling part 56. On the coupling part 55 a ring 59 is provided which is fixed to the said coupling part by means of a peg 60 and assures the axial position of the shaft 13, the ring 59 being supported on that front surface of the bearing 61 which faces the other coupling part 56. The part formed by the screw-spindle 9 and the coupling-half 56 is supported on the one hand in the bearing 62, and on the other hand in the extension piece 63 of the arm 10. Between the extension piece 63 and the screw-spindle 9 a ring 64 is fixed on the shaft part 65 likewise, a compression spring 66 being provided between the said ring and the extension piece 63. The spring 66 tends to bring the coupling 55, 56 into the operative position. A serrated wheel 35 is fixed on that end of the shaft part 65 which projects from the extension piece 63. The device described serves for re-setting the guiding member 14 into the initial position. For this purpose the serrated wheel 35 is moved in the direction of the arrow 67 and rotated in the corresponding sense, the coupling 55, 56 being thereby disconnected. The worm-wheel 21 is driven through the worm 24 connected through the pair of bevel wheels 68 with the shaft of the motor 46. The shaft 13 is journalled rotatably in the carrier 29. In the upper part of the carrier 29 a screw 31 is fixed which is capable of being displaced in a slot 32 of the board 20 in a direction extending in parallel to the sound trace carrier and of being tightened by means of the serrated wheel 30. During the displacement of the carrier 29 in the slot 32 the arm 10 likewise moves in a slot 33 provided in the board 20 and extending in parallel to the sound trace carrier.

The screw 31 carries a pointer 36 which, during the motion of the screw 31 in the slot 32, moves along a metre scale 37. Before cutting the sound trace carrier, i. e., before taking a sound record or before playing a sound trace carrier carrying a record cut into it, the pointer 36 is first of all adjusted on the metre scale 37 in accordance with the length of the sound trace carrier and secured in this position by means of the wheel 30, the wings 15 together with the guiding member 14 being during this operation displaced to the corresponding position of the pick-up arm 23 so that the needle of the pick-up 19 comes to be placed at such a distance from the axle 25 as to ensure that the needle should move transversely to the sound traces at a velocity corresponding to the length of the sound trace carrier.

Fig. 4 shows an arrangement for the driving of the pick-up arm in which the pick-up is moved transversely to the direction of the sound traces by the motion of the sound trace carrier itself. In this case there is employed in place of the smooth deflecting roller 6 a toothed drum 38 the teeth of which are engaging into the perforations of the sound trace carrier so that the sound trace carrier running over the drum 38 towards the pick-up effects the rotation of the drum 38. On that end of the shaft 40 of the drum 38 which is situated behind the board 20, a screw spindle 41 is provided which through the worm-wheel 42 drives the screw-spindle 43, which latter drives the screw-spindle 9, as shown on Fig. 3, through the worm-wheel 44 and the shaft 45. As appears from Fig. 3, the said screw-spindle 9 carries the guiding member 14 comprising the wings 15. In the case of this arrangement the mechanical connection shown on Figs. 2 and 3 between the driving motor 46 and the spindle 9 is not required, nor is it necessary that the parts of the driving gear should, as shown on Figs. 1 to 3, be displaceable in the direction of the sound trace carrier. The adaptation of the transverse velocity of the pick-up to the actual length of the sound trace carrier is effected in the case of this arrangement in a simple manner by constructing the drum 38 as an exchangeable drum and providing, for each set of apparatus, a number of toothed drums 38 having different diameters. In each case a toothed drum 38 of such diameter and accordingly of such number of teeth as corresponds to the length of sound trace carrier inserted in the particular case is mounted on the shaft 40.

The supporting member for the loose coil of the sound trace carrier may instead of three finger-shaped supports also consist of more than three such supports or possibly of less than three such supports, e. g., possibly also only a single support.

Instead of the worm-gears shown in the figures it is of course also possible to employ any other desired kinds of driving gear.

What I claim is:

1. In apparatus for the picking-up and reproduction of sounds for endless ribbon-shaped sound trace carriers a series of smooth obliquely inclined horizontally positioned fixed pins for supporting said sound trace carrier and causing it to coil, a propelling drum for the sound trace carrier, a motor for driving this propelling drum, a guiding roller for the sound trace carrier, a pick-up for the picking-up and reproduction of sounds, arranged on a pivotable carrying arm, and a guiding member driven by the running sound trace carrier for displacing the pick-up transversely to the sound trace.

2. In apparatus for the picking-up and reproduction of sounds for endless ribbon-shaped sound trace carriers a series of smooth obliquely inclined horizontally positioned fixed pins for supporting said sound trace carrier and causing it to coil, a propelling drum for the sound trace carrier, a motor for driving this propelling drum, a toothed guiding roller for the sound trace carrier, a pick-up for the picking-up and reproduction of sounds, arranged on a pivotable carrying arm, a guiding member for displacing the pick-up transversely to the direction of the sound trace, and a transmission gear between the toothed guiding roller driven by the running sound trace carrier and the guiding member of the pick-up.

3. In apparatus for sound reproduction, a support for a coil formed in an endless ribbon comprising a series of smooth pins fixed in horizontal positions to enter and support the coil said pins being arranged obliquely relatively to the plane of the path of travel of the ribbon, whereby the running off direction of the ribbon is from the interior of the coil, an idler spaced from the

coil support to have a loop of the ribbon extend from the inside of the coil beneath and around the idler to the outside of the coil, a ribbon driving mechanism over which the ribbon extending from the idler to the outside of the coil passes, an arm mounted at one end to swing on a vertical axis, a pick-up carried by the free end of said arm to engage the ribbon between the driving mechanism and idler, means actuated from said driving mechanism engaging said arm and causing slow swinging movement of the arm and pick-up as the ribbon passes beneath the pick-up, said means including a screw actuating the arm and detachably coupled to the driving mechanism, and means acting to uncouple said screw upon termination of the swing of the arm in one direction.

ALAJOS MAY.