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SOUND RECORDING AND REPRODUCING APPARATUS

Filed May 1, 1924

Fig. 1.

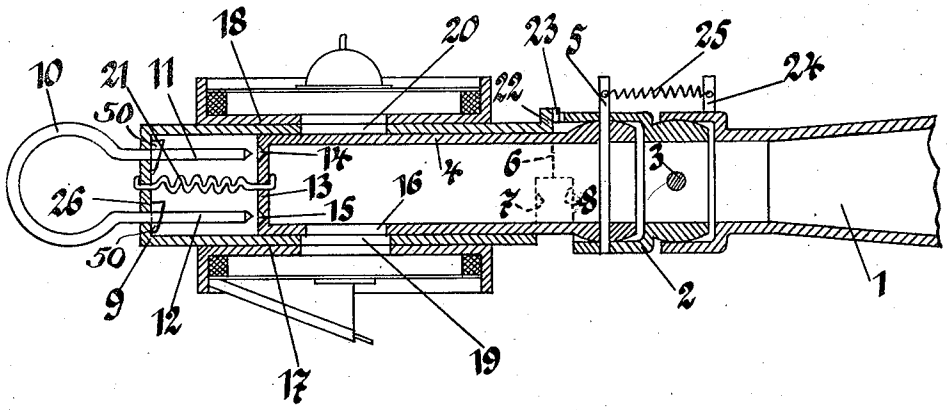
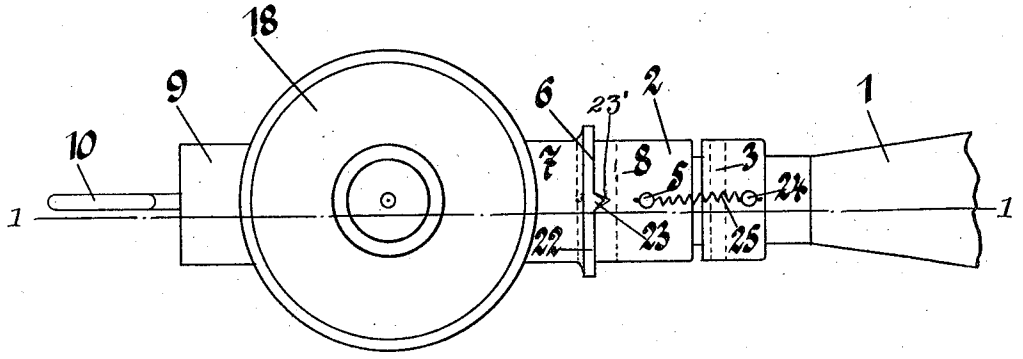


Fig. 2.



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SOUND RECORDING AND REPRODUCING APPARATUS.

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My invention relates to sound recording and reproducing apparatus and more particularly to a device which permits of the reversal of the recording and reproducing sound boxes for the purpose of bringing either sound box into engagement with the record carrier. One feature of the invention consists in a tubular member with an opening or sound port at the side turned towards the record, being connected by a movable joint to the tone arm so as to enable the said tubular member to swing horizontally and vertically with respect to the tone arm. Means are provided for preventing the tubular member or sound boxes attached thereto from swinging horizontally, that is around a vertical axis, when the recording sound box is in its operative position. But when the reproducing sound box is in its operative position the tubular member is permitted to swing.

By this arrangement in accordance with the invention good records can be obtained with certainty and very satisfactory reproduction is also accomplished even if soft records, for example wax plates, are employed.

The invention is shown, by way of example, in the drawing, in which—

Fig. 1 is a vertical longitudinal section on line 1—1 of Fig. 2 and

Fig. 2 a top view of the novel device.

1 is a tone arm, which is preferably arranged to be moved laterally by positive mechanism. Attached to the tone arm by a horizontal pivot 3 is a sound conducting link 2 which has a spherical surface embraced by the end of the tone arm 1 so as to form a fairly close fitting joint. The pivoted sound conducting link 2 carries a vertical pivot 5 which passes through the end of a tubular member 4. The end of the tubular member also has a spherical surface fitted into the enlarged end of the sound conducting link 2 so as to form a fairly close joint. The free end of the tubular member 4 is closed by a wall 13. Slipped over the tubular member 4 is a sleeve 9 to which there are attached a recording sound box 17 and a reproducing sound box 18. The tubular member 4 has an opening or sound port 16 facing downwards. The sleeve 9 has two sound openings 19 and 20 displaced with respect to each other by 180° and adjoining the openings in the sound boxes 17 and 18. The sleeve 9 is adapted to be turned on the tubular member 4. In Fig. 1 the recording sound box 17 is turned downwards so that the sound ports 16 and 19 register with each other and the sound box 17 is in communication with the interior of the tubular sound conducting member 4 and the tone arm 1. Communication between the sound box 18 and the tone arm is however interrupted by the upper wall of the tubular member 4. When the sleeve 9 is turned through 180° the reproducing sound box 18 is placed in communication with the tone arm 1 while the recording sound box 17 is cut off. Between the end wall 13 of the tubular member 4 and the end 26 of the sleeve 9 there is arranged a tractile spring 21 which tends to pull the tubular member 4 into the sleeve 9 and thus urges the end surface 22 of the sleeve 9 into contact with the end surface of the sound conducting link 2. By this abutment of the two said end surfaces against each other lateral movement of the tubular member 4 with respect to the sound conducting link 2 is prevented so that the recording sound box 17 is secured against horizontal swinging motion. The sound box 17 is thus only able to swing vertically on the pivot 3.

The adjacent ends of the members 9 and 2 are recessed, the recesses extending around ½ or preferably more than ½ of the circumference of these members.

Fixed in the closed end of the sleeve 9 is a handle 10 secured by pins 50 shaped somewhat like a staple whose two limbs 11 and 12 project into the space in the sleeve 9 located between the end walls 13 and 26. When the sleeve 9 is turned through 180° the contacting end surface 22 is turned down opposite to the recess 8, while the recess 7 is turned to the top. The end surface 22 and the co-operating end surface of the link 2 are now able to move into the recesses 8 and 7 so that the spring 21 urges the limbs 11 and 12 against the end wall 13, the pointed ends of the limbs 11 and 12 entering into engagement with small recesses 14 and 15 in the end wall 13 and thus preventing the further travel of the sleeve 9 towards the tone arm 1. The numeral 6 upon the drawings indicates the abutting ends of the surfaces 22 and 2. The end surface 22 and the corresponding end

surface of the link 2, are now out of engagement with each other so that the tubular member 4 is capable of swinging horizontally around the vertical pivot 5. Thus, when the reproducing sound box 18 is turned downwards, that is to say into its operative position, it is able to swing not only vertically around the pivot 3 but also horizontally around the pivot 5.

By the engagement of the points of the limbs 11 and 12 with the recesses 14 and 15 the sleeve 9 is secured against unintentional rotation round the tubular member 4. Such rotation is also prevented when the recording sound box 17 is in its operative position by a projection 23 that enters a recess in the end of the tubular member 2.

To reverse the positions of the sound boxes the operator seizes the handle 10 and pulls the sleeve 9 outward a slight distance and thereupon turns it through 180° until the ends of the limbs 11 and 12 enter their recesses or until the projection 23 enters its recess 23.'

If a sound impression is to be produced on comparatively soft plates or records and it is found that the sound boxes are unduly heavy, the downward pressure of the sound boxes may be decreased by a spring 25 which may be attached to a prolongation of the pivot 5 and a post 24 on the tone arm. The spring 25 tends to swing the sound box arrangement upward around the pivot 3.

By arranging the spring 21 inside the sleeve 29 the advantage is obtained that the spring is entirely enclosed and protected from unintentional or needless interference which may result in disturbances of the apparatus.

I claim:—

1. In a sound recording and reproducing apparatus, a sound conducting tubular member open at one end and closed at its other end and having an opening in its wall, a tone arm, an open intermediate movable joint adapted to swing about a horizontal axis on said tone arm, a vertical pivot connecting said joint and the open end of said tubular member, a sleeve closed at its free end slidably fitted on the said tubular member and having two opposed sound openings, a recording sound box provided on said sleeve opposite one of the sound openings therein, a reproducing sound box provided on said sleeve opposite the other sound opening therein, and means for preventing relative horizontal movement between said joint and said tubular member when the recording sound box is in communication with the tone arm through the sound openings in said sleeve and tubular member.

2. In a sound recording and reproducing apparatus, a sound conducting tubular member open at one end and closed at its other end, and provided with an opening in its wall, a tone arm, an intermediate movable open joint movable on said tone arm about a horizontal axis, a vertical pivot connecting said joint and tubular member, a sleeve closed at its free end slidably fitted on said tubular member and having two opposed sound openings, a recording sound box provided on said sleeve opposite one of said sound openings therein, and a projection on said joint adapted to abut against the edge of said sleeve so as to prevent horizontal movement of the latter relative to said tone arm when the recording sound box is in communication with said tone arm through the sound openings in said sleeve and said tubular member.

3. In a sound recording and reproducing apparatus, a sound conducting tubular member open at one end and closed at its other end and having an opening in its wall, a tone arm, a movable intermediate open joint movable about a horizontal axis on said tone arm, a vertical pivot connecting said joints and said tubular member, a sleeve closed at one end fitted slidably over said tubular member and having two opposed sound openings, a recording sound box provided on said sleeve opposite one of the said sound openings therein, a reproducing sound box provided on said sleeve opposite the other sound opening therein, a projection provided on said joint and arranged to abut against the edge of said sleeve thereby preventing horizontal movement of the latter relative to said joint when the said recording sound box is in communication with said tone arm through the sound openings in said sleeve and said tubular member, and means to unlock said joint and sleeve permitting horizontal movement thereof when the said reproducing sound box is in communication with said tone arm.

4. In a sound recording and reproducing apparatus, a sound conducting tubular member open at one end and closed at its other end and having an opening in its wall, a tone arm, a sound conducting intermediate member between the said tubular member and said tone arm and adapted to swing about a horizontal axis on said tone arm, a vertical pivot connecting said intermediate member and said tubular member so as to permit the latter to swing horizontally relative to said intermediate member, a sleeve closed at its free end slidably fitted over said tubular member and having two opposed sound openings therein, a sound recording box provided on said sleeve opposite one of said sound openings, a projection on said intermediate member adapted to abut against the edge of said sleeve thereby preventing horizontal movement of the latter relative to the tone arm when the sound recording box is in communication with said tone arm through the sound openings in said sleeve

and said tubular member, and means for unlocking the said sleeve and said intermediate member when the reproducing sound box is in communication with said tone arm through the said sound opening, and a spring between the closed end of said tubular member and the closed end of said sleeve for forcing said end surfaces against each other thus preventing horizontal movement when the recording sound box is in communication with said tone arm.

In testimony whereof I affix my signature.

DR. ING. ERWIN KRAMER.