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DEVICE FOR MECHANICALLY RECORDING SOUND IN TWO TRACKS

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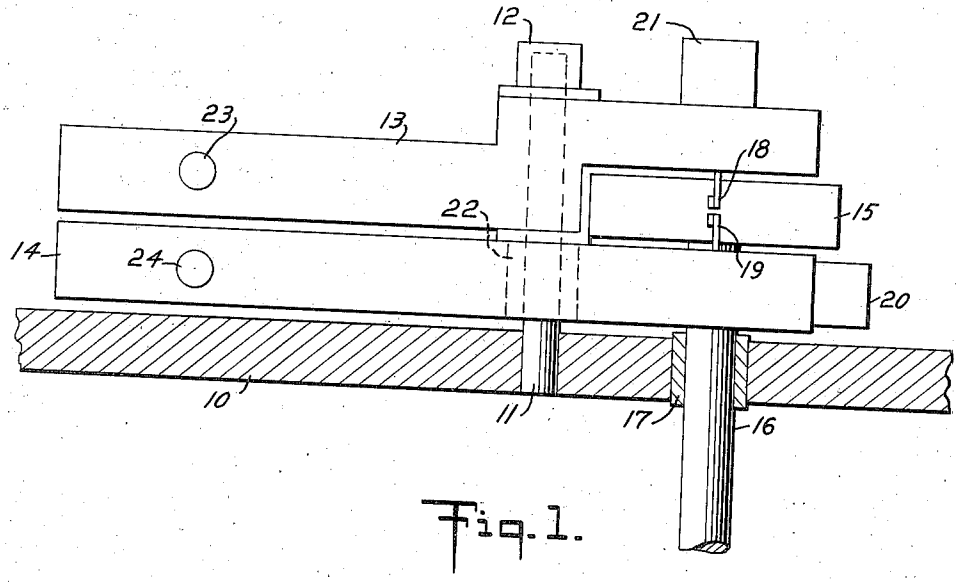


Fig. 1.

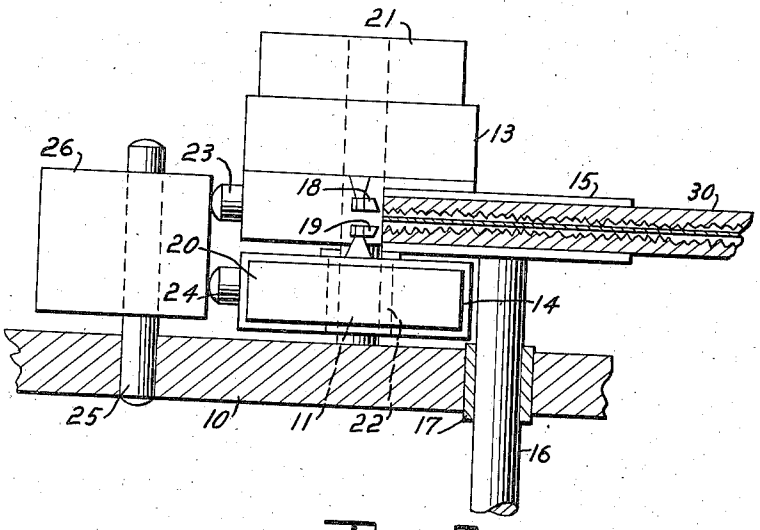


Fig. 2.

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DEVICE FOR MECHANICALLY RECORDING SOUND IN TWO TRACKS

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3 Claims. (Cl. 274—11)

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Devices for mechanically recording sound in several, for example two, tracks on a band-shaped carrier are known. These recording devices comprise two rotary drums on which the film travels and on which the recording takes place. In this case corresponding points of the sound tracks are consequently displaced over some distance in the longitudinal direction of the film. In the reproduction this distance must be taken into account in order to obtain synchronous reproduction of corresponding parts of the various sound tracks.

The drawback of this method is, however, that there must be provided various spatially separated reproducing devices so that the reproducing equipment considerably increases in size. Moreover, the mutual distance of corresponding points often varies in the lapse of time between the recording and the reproduction due to elongation or shrinking of the film so that synchrony between the sound tracks is not alawys ensured.

In photographically recording sound in a plurality of tracks it is known to record corresponding points of the sound tracks side by side so that the above-mentioned drawbacks are avoided. In mechanical recording it has hitherto been impossible for constructional reasons to place the two recording needles side by side within the available track width.

According to the invention, these drawbacks are eliminated by constructing at least one of the phonogram recorders in such manner that it may be present between the recording drum and the base plate of the apparatus so that the two recorders may be placed on either side of the recording drum, in such manner that the recording needles of these recorders are located side by side on the circumference of the recording drum. In order to be able to record the two sound tracks exactly side by side on the carrier, it is furthermore necessary that the two phonogram recorders are secured by the same means of support to a common base plate and that the shaft of the recording roller is likewise supported by this base plate.

If all the above-mentioned requirements are satisfied, it is possible to record two sound tracks in a reliable manner side by side at the same point on a carrier in such manner that the reproducing devices may be united to form one constructional unit and need not be adjustable with respect to one another. The phonogram

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recorder present between the drum and the base plate of the apparatus should have the smallest possible height in order to avoid unnecessary lengthening of the shaft of the recording drum and thus bending and vibrations in this shaft.

The invention will be explained more fully with reference to one embodiment thereof.

Fig. 1 represents a lateral elevation of a mechanical recording device for two sound tracks located side by side and

Fig. 2 represents a front-view of this device.

In the figures 10 denotes a base plate having mounted on it all the components essential for mechanical recording. This plate 10 has rigidly secured in it a pin 11 which passes through and fits exactly in a hole provided in each of the phonogram recorders 13 and 14. With the aid of a cap nut 12 the two phonogram recorders are held firmly on the pin 11 so that any undesired displacement of the recorders relatively to one another and to the base plate 10 is excluded.

In the same base plate is journalled, through the intermediary of a bronze bush 17, the shaft 16 of a recording drum 15. The two recorders 13 and 14 are arranged on either side of this drum in such manner that chisels 18 and 19 respectively of these recorders are located side by side opposite the circumference of the drum. With the aid of a known construction of guide rollers and pressure rollers and carrier 30 in which the two sound tracks are to be recorded is caused to travel along the circumference of the drum 15 underneath the chisels 18 and 19.

In order to render possible the above-mentioned arrangement on either side of the recording drum with the chisels side by side on the circumference of the drum, the chisel must be directed in the one recorder in a sense opposite to that of the other recorder, reckoning with respect to the means of attachment of the recorder, in the present instance the hole for the pin 11 and adjusting lugs 23 and 24 which will be described hereinafter. Moreover, one of the two recorders is present between the recording drum 15 and the base plate 10. Since, in view of vibrations and bending under the pressure of the cutting chisels 18 and 19, the length of the shaft 16 must be kept as small as possible, the recorder 14 has been given a very flat shape. A permanent magnet 21, which is commonly placed against the side-faces of the pole shoes is arranged for compactness on that side of the re-

corder 13 which is remote from the chisel 18. In the recorder 14 a similar purpose rod magnet 20 is arranged against the front side of this recorder.

In recording sound tracks whose corresponding sound amplitudes are to be reproduced in exact synchronism, for example a stereophonic sound record with two channels or a push-pull sound record, the chisels 18 and 19 must be placed exactly in a line perpendicular to the direction of travel of the record carrier. In order to be able to compensate for small divergencies due to the use of different chisels, at least one of the recorders must be re-adjustable in the direction of travel of the carrier, i. e. in the direction of the line tangent to the roller 15 at the point of recording. This is achieved by providing in the recorder 13 a sleeve 22 through which the supporting pin 11 passes eccentrically. By turning the sleeve 22, for example with the aid of a micrometer screw, it is possible to readjust the chisel 19 relatively to the chisel 18.

The cutting depth of each of the chisels 18 and 19 may also be re-adjusted separately. On the back part each recorder is provided with a lug, 23 and 24 respectively, the length of which can be adjusted for each recorder separately with the aid of a micrometer screw which is not shown. Under the action of a heavy spring, which is not shown in the drawing, these lugs 23 and 24 are drawn against the outer surface of an eccentrically supported roller 26. The shaft 25 of this roller is secured in the base plate 10. Owing to the rotation of the roller 26 the chisels 18 and 19 are simultaneously brought into and out of contact with the carrier on the drum 15. The exact adjustment of each separate chisel is regulated by re-adjusting the lugs 23 and 24 respectively.

Although in the foregoing a chisel has been described as the mechanically recording tool, it is evident that the invention may be applied to any method of recording wherein two tracks have to be recorded side by side on a single carrier with the aid of needles, sapphires, chisels or other mechanically operating tools. The invention may therefore also be applied to a method wherein, with the aid of two chisels having bevel cutting edges which form together a V, two unilaterally modulated optically reproducible tracks are cut in a carrier comprising an opaque thin top layer and a transparent recording layer, as is shown in Fig. 2.

If in the recording use is made of a method known in itself for varying the average cutting depth in dependence on the value of the amplitude, for example in order to reduce the cutting resistance or, in the case of optically reproducible sound records, to reduce the parasitic noises, the average cutting depth should preferably be regulated for both recorders simultaneously and in the same measure, owing to which a one-sided load of the film at the point of recording is avoided.

I claim:

1. A device for mechanically recording sound in two tracks on a band-shaped carrier, comprising a base plate member, a recording drum member having its axis substantially perpendicular to the base plate and spaced therefrom, a rotatable shaft for said drum member journalled in said base plate, a phonogram recording member arranged between the base plate and the said drum member and having the recording element thereof positioned over the circumference of said drum member, another phonogram recording member arranged on the opposite side of said drum member and having the recording element thereof positioned over the circumference of said drum member adjacent to the recording element of the first of said recording members, and means to support said recording members on said base plate.

2. A device for mechanically recording sound in two sound tracks on a band-shaped carrier, comprising a base plate member, a recording drum member having its axis substantially perpendicular to the base plate and spaced therefrom, a rotatable shaft for said drum member journalled in said base plate, a phonogram recording member arranged between the base plate and the said drum member and having the recording element thereof positioned over the circumference of said drum member, another phonogram recording member arranged on the opposite side of said drum member and having the recording element thereof positioned over the circumference of said drum member adjacent to the recording element of the first of said recording members, means to support said recording members on said base plate comprising a pin member secured to said base plate and journalled through said recording members, a member common to the recording members to simultaneously rotate the same about the said pin member as a pivot for placing the said recording elements into operative position, and adjustable stop members engaging the said recording member and the said member common to both recording members for independently rotating one of said recording members about said pin member.

3. A device for mechanically recording sound in two sound tracks on a band-shaped carrier, comprising a base plate member, a recording drum member having its axis substantially perpendicular to the base plate and spaced therefrom, a rotatable shaft for said drum member journalled in said base plate, a phonogram recording member arranged between the base plate and the said drum member and having the recording element thereof positioned over the circumference of said drum member, another phonogram recording member arranged on the opposite side of said drum member and having the recording element thereof positioned over the circumference of said drum member adjacent to the recording element of the first of said recording members, means to support said recording members on said base plate comprising a pin member secured to said base plate and journalled through said recording members, and means to align the said adjacently positioned recording elements, said means comprising a rotatable sleeve member having eccentrically related inner and outer surfaces and positioning one of said recording members on the pin member.

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