

[54] **DRIVING DEVICE FOR OPPOSITELY ROTATING TONE SHAFTS OF A SOUND RECORDING DEVICE**

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[52] U.S. Cl. .... **242/201, 274/4 D**

[51] Int. Cl. .... **B11b 15/32, G03b 1/04**

[58] Field of Search ..... **242/200-204;**  
274/4 D, 11 D

[56] **References Cited**

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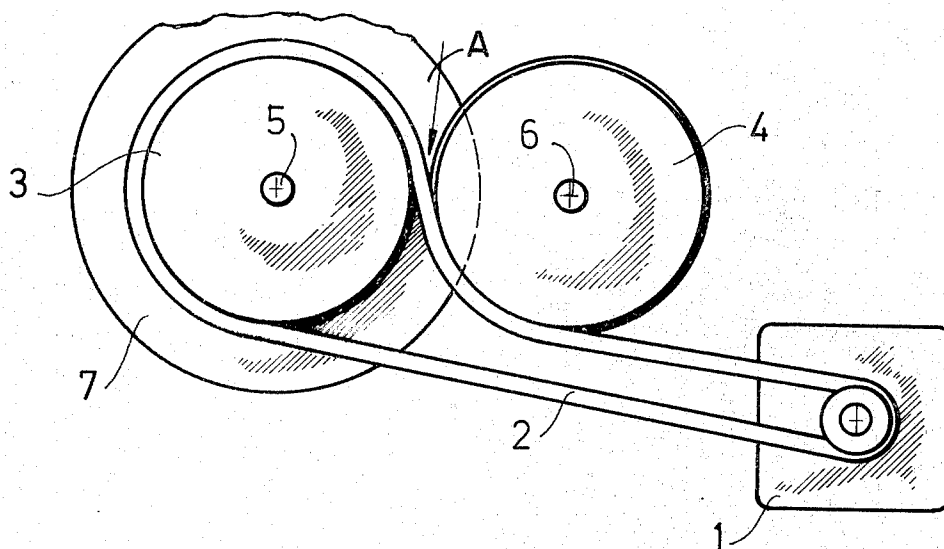
*Primary Examiner*—Leonard D. Christian

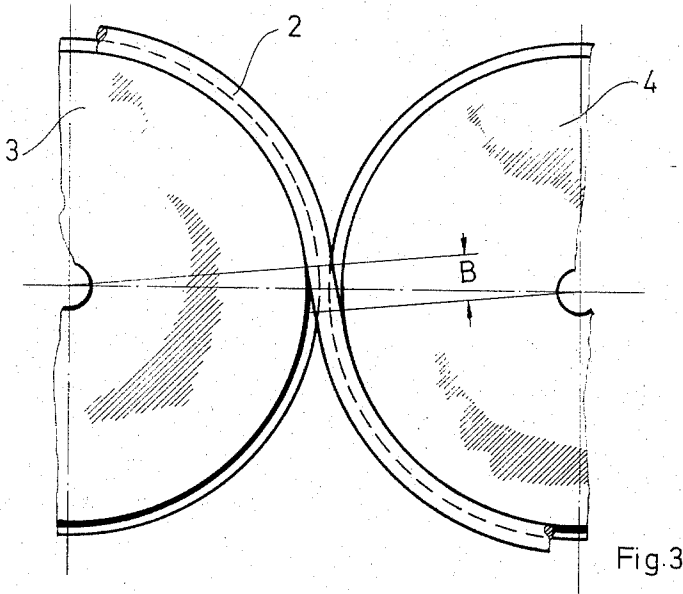
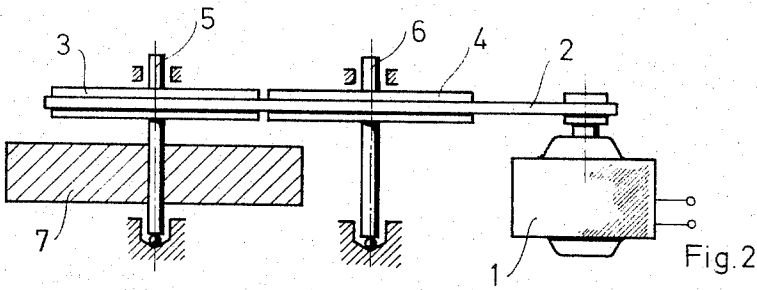
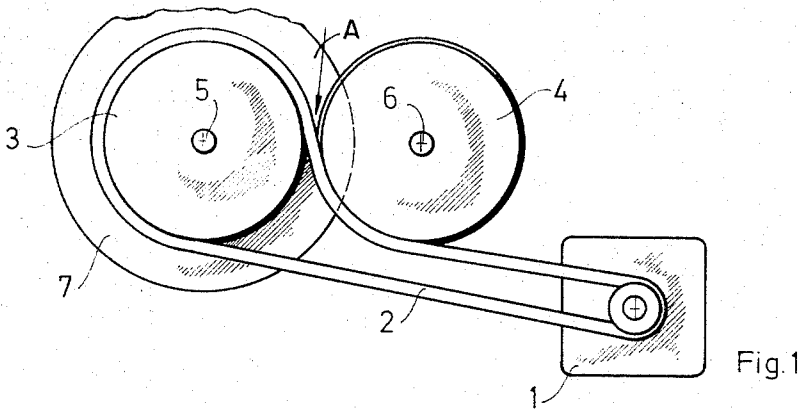
*Attorney*—Ernest G. Montague

[57] **ABSTRACT**

A driving device for the tone shafts of a sound recording device which comprises a motor, a first tone shaft, and a flywheel-mass disposed coaxially to the first tone shaft and operatively connected therewith. A first belt pulley is disposed coaxially to the first tone shaft and likewise operatively connected therewith. A second tone shaft has an axis substantially parallel to the axis of the first tone shaft. A second belt pulley is disposed coaxially to the second tone shaft and operatively connected therewith, as well as having its periphery close to the periphery of the first belt pulley. An elastic belt driving the first belt pulley and the second belt pulley by means of the motor in opposite directions, and the elastic belt has such height, that the portion of the belt disposed between both belt pulleys is not pressed together by the belt pulleys, yet runs freely for such short path, that the longitudinal elasticity being so small, not to exert a disturbing influence on the uniformity of the rotary speed of the second tone shaft during the operatively occurring load fluctuations of the second tone shaft.

**2 Claims, 3 Drawing Figures**





# DRIVING DEVICE FOR OPPOSITELY ROTATING TONE SHAFTS OF A SOUND RECORDING DEVICE

The present invention relates to a driving device for two oppositely rotating tone shafts of a sound recording device, in general, and to such tone shafts which are driven by a motor via a single belt and selectively by application of a sound recording tape serve as a speed-determining drive means for the recording tape.

Devices of this type are used, when the recording tape is supposed to vary fast its direction of movement during the working action, i.e., with avoidance of a speed reversal of flywheel masses. For this purpose conventionally two tone shafts are driven with a flying wheel each in opposite directions. The drive of a fly wheel mass by means of an elastic belt represents generally a very low-frequency-oscillation formation, with the advantage, that non-uniformities of the motor rotations are not transformed to the fly-wheel-mass speed. Though it could be expected, that, in case of coupling of two flywheel-masses to a motor, the synchronism-stability of the individual flywheel-masses would also increase, more exact investigations have disclosed, that the opposite is the case.

In order to arrange two tone shafts at a relatively small axial distance, i.e., at a distance, which is smaller than the radius of the fly-wheel-masses, one must neglect one of the flywheel-masses. In a known arrangement, for this purpose the two tone shafts are coupled together with two correspondingly smaller friction wheels, whereby the tone shaft is driven by the motor via a belt.

The drawback of such arrangement is, that due to the unavoidable unround formations of the friction wheels, different axial pressures and thereby synchronism disturbances are created. In addition to the belt as a drive means, a friction wheel drive is also required.

It is one object of the present invention, to provide a driving device for two oppositely rotating tone shafts of a sound recording device, wherein the uniformity of the speed of both tone shafts by use of a belt as a sole drive means is improved.

It is another object of the present invention to provide a driving device for two oppositely rotating tone shafts of a sound recording device, wherein only one of the tone shafts carries a flying-wheel-mass and belt pulleys sitting coaxially to said tone shafts are disposed so tight in a plane adjacent each other, that, on the one hand, the belt is not yet pressed together between the two belt pulleys; on the other hand, however, a freely running belt-piece is only so long, that the longitudinal elasticity is small enough, in order not to be capable to exert a disturbing influence on the uniformity of the rotary speed of the flywheel-mass-less tone shaft in the operatively conventional occurring fluctuations on this tone shaft. With these and other objects in view, which will become apparent in the following detailed description, the present invention, which is shown by example only, will be clearly understood in connection with the accompanying drawing, in which:

FIG. 1 is a top plan view, shown schematically, of a tone shaft driving device;

FIG. 2 is a side elevation of the device disclosed in

FIG. 1; and

FIG. 3 is a fragmentary top plan view, shown at an enlarged scale, of the belt arrangement shown at A in FIG. 1.

Referring now to the drawing, two belt pulleys 3 and 4, which each sit on a tone shaft 5 and 6, respectively, are driven by means of a continuous belt 2. One of the tone shafts carries a flywheel-mass 7. The belt 2 runs free only over a very short path between the two belt pulleys 3 and 4. How short the freely running belt piece B is to be chosen, depends upon different factors, by example, upon the belt cross-section and the elasticity module of the used material, but also upon the tolerance, i.e., in the direction towards the tone shaft. On the one hand, the elasticity of the belt piece B is supposed to be low in longitudinal direction, so that the coupling of the flywheel-massless tone shaft 6 with that flywheel-mass 7 is stiff as much as possible, in order to permit the stabilizing effect of the flywheel-mass 7 fully as much as possible also on the coupled tone shaft 6. On the other hand, the belt pulleys 3 and 4 cannot sit so tight to each other, that with the conventional tolerances, in particular in the belt thickness leads to a more or less strong pressing together of the belt therebetween and thus to changing energy losses by fulling and to different bearing pressures. In the practice, a freely running belt piece of a length B, which corresponds about the thickness of the belt, has been found satisfactory.

While I have disclosed one embodiment of the present invention, it is to be understood, that this embodiment is given by example only and not in a limiting sense.

I claim:

1. A driving device for the tone shafts of a sound recording device, comprising

a motor,

a first tone shaft,

a flywheel-mass disposed coaxially to said first tone shaft and operatively connected therewith,

a first belt pulley disposed coaxially to said first tone shaft and likewise operatively connected therewith, a second tone shaft having an axis substantially parallel to the axis of said first tone shaft,

a second belt pulley disposed coaxially to said second tone shaft and operatively connected therewith, having its periphery close to the periphery of said first belt pulley,

an elastic belt driving said first belt pulley and said second belt pulley by means of said motor in opposite directions, and

said elastic belt having such height, that the portion of said belt disposed between both said belt pulleys runs freely for such short path, that the longitudinal elasticity being so small, as not to exert a disturbing influence on the uniformity of the rotary speed of said second tone shaft during the operatively occurring load fluctuations of said second tone shaft.

2. The driving device, as set forth in claim 1, wherein said height of said belt corresponds with the length of said belt portion running freely between said belt pulleys.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,782,656

Dated January 1, 1974

Inventor(s) Werner Broghammer

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet, in item [75] after the inventor's name "Hauptstrasse 13," should be added, and -- 7741 -- should be added before "Tennenbronn" .

In item [73] "Georgen" should read -- 7742 St. Georgen --.

Signed and sealed this 3rd day of September 1974.

(SEAL)

Attest:

McCOY M. GIBSON, JR.  
Attesting Officer

C. MARSHALL DANN  
Commissioner of Patents