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RECORD CARRIER DRIVE FOR SOUND TRACK REGISTERING MACHINES
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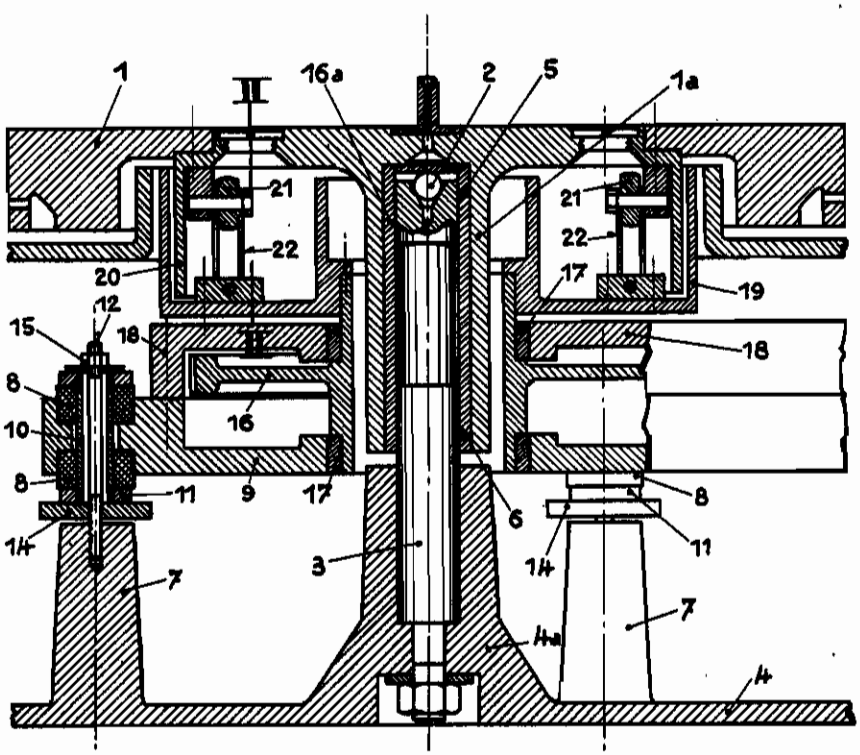
Fig. 1



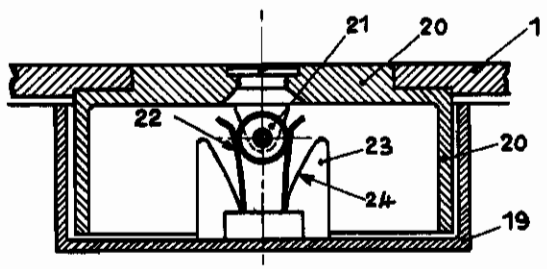


Fig. 2

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ALIEN PROPERTY CUSTODIAN

RECORD CARRIER DRIVE FOR SOUND TRACK REGISTERING MACHINES

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As is well known, in sound track registering machines, the speed of revolution of the platform supporting a disk-shaped record being engraved should be as constant as possible. It is in particular absolutely imperative to preclude all vibrations and periodic variations of the speed of revolution because such periodic variations as for example those caused by the coming of gear teeth into meshing relation are perfectly perceptible when afterwards playing the record. It has even been noticed that the very unevenness of balls used in registering records generates vibrations which are detrimental to a high grade registration. Therefore in order to permit the achievement of a perfect registration on records, it is necessary to avoid, on the one hand, the transmission of vibrations set up by the motor and gear to the record-carrying platform and, on the other hand, the occurrence of any variation in the speed of revolution of said platform.

Devices created heretofore to fulfill the aforesaid requirements are generally very complicated and hard to assemble and adjust while not being entirely satisfactory because whereas the vibrations from the motor and the variations of its power torque are not actually transmitted to the platform, yet the vibrations generated by frictions arising between the stationary and movable portions of the platform spindle bearings may be propagated to said platform.

An object of the present invention is to provide a new or improved device obviating the aforesaid disadvantages and adapted to uniformly drive the record-carrying platform of a sound track registering machine, wherefor said platform is pivotally supported or revolubly fulcrumed on a vertical pin or stem rigid with a frame and has point or tangential contact at its center on a bearing surface provided endwise on said pin.

Another object of the invention is to provide a driving device as aforesaid adapted to minimize frictions and to inhibit the generation of vibrations such as those produced by multiple fulcrum bearings, means being provided for preventing motor vibrations and instantaneous speed variations from being transmitted to the record carrier.

A further object of the invention is to provide a driving device as aforesaid wherein swift and small amplitude oscillations are nullified by the high inertia of the record-carrying platform.

And a still further object of the invention is to provide a record carrier driving device as aforesaid made up of parts so constructed in a rugged and durable way and so mutually combined as to afford comparative important advantages so far as easiness of assembly, dismantling and adjustment are concerned.

With these and such other objects in view as will incidentally appear hereinafter, the invention comprises the novel construction, combination and arrangement of parts that will now be described in detail with reference to the accompanying diagrammatic drawing exemplifying a convenient embodiment of the same and forming a part of the present disclosure.

In the drawing:

Figure 1 is mostly an axial sectional view of the device in its entirety.

Figure 2 is a fragmentary sectional view on the line II—II of Fig. 1.

As shown in Fig. 1, the platform 1 adapted to carry a record (not shown) to be sound registered by a conventional engraving process capable of producing a modulated track or furrow is centrally supported in equilibrium upon an axial bearing comprising a ball 2 housed in a conical recess formed in the upper end of a vertical pin or stem 3 rigidly set into a socket 4a on the base frame 4. Said socket 4a is of sufficient length to hold the pin properly guided and centered and to ensure perfect steadiness thereof in its upstanding position.

The pin 3 has a pair of bearing surfaces 5, 6 separated by a reduced portion and tightly fitted in a bushing tucked up into a hollow hub portion 1a extending downwardly from and rigid with the platform 1.

Integral with the base frame 4 are three posts such as 7 on which the motor and speed reducer or gear unit of conventional structure (not shown) is supported by means of damping or cushioning blocks comprising resilient washers 8 (made for example of natural or synthetic rubber) shrunk into recesses formed in the lower surface of a bed plate 9. An elongated bush 10 threaded at both ends permits the washers 8 to be properly centered and clamped home in their recesses by means of nuts 11. Dowels 12 having threaded ends screwed into bores in the posts 7 and a smaller diameter than the inner diameter of the bushes 10 permit the bed plate 9 to be set and clamped at the required level in a horizontal plane by means of upper and lower nuts 14, 15.

It will be understood that, owing to this arrangement, no vibration from the motor and speed reducer gear casing can be transmitted to the frame and consequently to the record carrier 1.

The motor casing comprises the bed plate 9 on which the motor of known type (not shown) as well as the associated gear also of known type (not shown) which transmits the power torque to the record carrier 1 and revolves the same at suitable speed are supported. For the sake of clearness of the drawing, only a horizontal toothed wheel 16 and adjacent parts driving the platform 1 without transmitting torque varia-

tions are shown but it is believed that the remainder of the structure will be clearly understood from anyone skilled in the art.

The toothed wheel 16 is rotatably supported by means of bushes 17 fitted in the bed plate 9 and in the lid 16 of the motor casing. In said wheel 16 is formed a central recess having a sufficient diameter to provide ample space for snugly receiving the hub 1a of the platform 1 without any risk of contact.

The upper end of the hub 16a of the wheel 16 projects from the motor casing and carries, rigidly secured thereto by screws (not shown) the driving element of a coupling comprising a trough-shaped member 19 containing a suitable liquid of appropriate viscosity. Inside this member 19 is accommodated the driven element of the coupling, which element is fixed by screws (not shown) or the like to the platform 1. The driven element of the coupling also comprises a trough-shaped member 20 whose walls run parallel to those of the trough-shaped member 19 and are immersed in the liquid therein contained.

The record-carrying platform 1 is driven through a pair of motion transmitter rollers 21 diametrically opposed to each other and keyed to lugs rigid on the driven element 20, the latter being fixed in turn to the platform 1 by screws (not shown). Each roller 21 is embraced by a pair of blade springs 22 firmly secured at their lower ends to the trough-shaped member 19 forming the driving element of the coupling. The distortions of said blade springs are limited on both sides of a balanced position by stops 23 (Fig. 2) having a slightly convex inner face 24 to enable said blades to come into resting engagement thereagainst. The outline of the faces 24 is so selected as to cause a relatively small motion of the roller 21 to correspond to a large variation of the blade spring behavior owing to a change of its free length.

The operation of the device takes place very simply as follows:

When the motor operates, it drives through a gear of known type (not shown) the wheel 16 and trough-shaped member 19. The record-carrying platform 1 is revolved through the blade springs 22 and the rollers 21 frictionally embraced thereby. When starting, as the platform inertia is considerable, the springs 22 yield off and come into contact with the stops 23 so that the drive becomes rigid until normal running conditions are reached. Afterwards the effort transmitted from the motor is reduced to that required for keeping the carrier in motion and overcoming the resistance thereon due to the engraving action on the record. Such resistance is extremely small. The rear spring which up to then was tight is raised, whereupon the roller moves to its balanced position (shown in the drawing). However, before reaching said position, the roller 21 comes into contact with the front spring whose flexional stress checks that of the rear spring.

It will be seen that shortly before reaching its position of equilibrium, the roller 21 assumes a position in which the resultant of the flexional stress of the springs exactly balances the driving stress, whereafter the platform 1 revolves at the same angular speed as the trough-shaped member 19.

In order that said position of equilibrium of the roller 21 should be well determined, the outline 24 of the stops 23 is so selected as to cause a small relative angular motion of the trough-shaped members 19, 20 to correspond with a large variation of the flexional stresses of the springs 22.

Quick oscillatory motions cannot be produced because the power torque is transmitted not by a single free spring but by a pair of oppositely acting springs whose resultant oscillation cycle has been so selected as to be very long. Such resultant cycle is further combined with the resultant cycle of the group of springs arranged at the other end of the same diameter, so that the final resultant has an extremely long cycle which is checked by the action of the fluid contained in the trough-shaped member 19. As a matter of fact, since the walls of said member 19 are parallel and quite close to those of the trough-shaped member 20, the fluid viscosity counteracts any substantial relative displacement between the members 19 and 20.

Quick and small amplitude oscillations are nullified by the high inertia of the record-carrying platform 1.

Moreover, as the platform 1 rests at its center on one point only, there can be no vibration or concomitant attrition (eating away) due to torque-acting frictions on facing parts as in the event of multiple fulcrum abutments. There can neither be any torque variation due to unevenness of the bearings or contacting surfaces. As the record-carrying platform is very heavy (about twenty to thirty kilograms) it is obviously necessary that those surfaces on which the ball 2 rests should be properly ground to true shape and suitably treated. Practical tests have shown, however, that there can be no premature wear of the contacting surfaces provided proper lubrication is effected.

It will be noticed that so far as adjustment, assembling and dismantling are concerned, the device according to the invention presents as above pointed out substantial advantages by comparison with known devices for similar purposes. A summary of said advantages is given hereafter:

As the platform 1 merely rests upon the ball 2 and is not held by the parts actuating the same to the driving element of the mechanism, it can be readily lifted and withdrawn from the pin 3, this permitting free access to be gained to the motor and gear unit which can be easily removed. As the motor casing is supported at three points, it is an easy task merely by adjusting the nuts 14 to proper levels so to arrange the trough-shaped member 19 as to cause it to revolve in true horizontality. Any suitable number of posts 7 may be provided for supporting the bed plate 9 of the motor casing.

It will be obvious from the foregoing that the ball bearing surface 2 may be arranged at any suitable level along the pin 3. However, it is advantageous, from the point of view of record carrying stability, that the contacting point between the ball 2 and platform 1 should lie flush with or higher than the center of gravity of said platform and hub extension 1a.

More than two rollers such as 21 cooperating with a pair of blade springs such as 22 might be provided, said multiple rollers being then advantageously located on a circumference and separated by equal distances, the center of said circumference being coincident with the pivotal axis of the coupling which in turn coincides with the axis of the record carrier.

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