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SOUND-RECORDING DISK

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1 Claim. (Cl. 274—42)

This invention relates to a sound recording disk wherein oxide film is produced by anodic treatment upon aluminium plate alloyed with a metal such as titanium or tungsten having an action of minimizing crystal grains of aluminium. The object of this invention is to obtain sound recording disks of aluminium alloy having easy sound recording, comfortable regeneration sound and remarkably less noise.

More fully, this invention relates to improvements of immediately recordable aluminium disk in which oxide film is produced on aluminium by anodic treatment. According to the study of the inventor, sound grooves on the recording disk coated with the oxide film of aluminium are manufactured by making yield on the soft aluminium lying under the oxide film by the sharp point under pressure. Though the oxide film reinforces sound grooves and gives wear-resisting quality and makes the employment of a steel needle possible, numeral cracks may be left in the oxide film in sound grooves. Accordingly, for the purpose of making the motion of a sound needle to run smoothly during regeneration of recorded sound and of preventing the growth of noise, improvements in formation of the film may be one method. However in this invention, more superior effects were obtained by studying the raw aluminium. Even hitherto, considerable attention was paid to the selection of raw aluminium. However required objects could not be fully attained due to special characters of the crystal structures of the metal disagreeing with one another.

This is due to the following facts. For sound recording of high tone having high frequency, the wavelength on the sound recording disk is extremely short. Thus, upon considering the fact that aluminium gives a remarkable influence upon the quality of the oxide film of the upper layer, it is necessary to select aluminium plate which is minute and homogeneous in crystal grains. But such plate is too soft due to its hot -rolling and though sufficiently deep and broad sound grooves can be gained, deformation of the material spreads over other than sound grooves, cracks of film at inside and outside of sound grooves are rough and plenty, and it can not be got rid of the fact that considerable noise is produced during regenerating recorded sound. Whereas, when crystal grains are made large by varying the condition of manufacturing aluminium plate suitably and its plasticity is improved, not only sound recording of high tone can not be performed as expected, but also the material lacks homogeneity, strain of crystal grains is plenty and uncomfortable regeneration sound is produced.

In short, hitherto known raw aluminium plates were not fully satisfied for material of recording disk with a mere selection of direction of applying press rolls and of degree of annealing even there are many varieties of purity in various industrial plates common in market and in the purest plate of 99.8%. Accordingly, the inventor made an experiment in which titanium was alloyed to aluminium and thereby crystal grains of the aluminium blank was minimized while in the operation of plate manufacture therefrom, somewhat insufficient annealing is applied and the directions of applying press rolls were selected to be alternatively right angular, so that, as the result, the softness of the material is rather decreased. When the plate thus obtained is subjected to anodic treatment or oxidation process in aqueous solution of oxalic acid with three phase electric current, he found following surprising facts that sound recording operation became very easy, regenerated sound was nice and accompanying noise was kept under one third of that of usual aluminium sound recording disk with equal amplitude, so that sound recording disks which are quite comparable to common market disks made of pressed material were obtained. The size of the crystal grain of the sound recording disk thus obtained is smaller than that of the most minimum grain of common aluminium plate hitherto employed, and its hardness approaches to that of known aluminium disk made by applying cold rolling to the direction alternatively at right angle and the oxide film which is closely related to the bed material, has proper elastic hardness, while brilliant and beautiful records having clear and bright colour can be produced. The same favourable results as those in the experiment of several sheets of samples can be substantially obtained in appropriate industrial scope. The quantity of titanium employed can be varied within a considerable extent such as 0.01% to 0.3% and even its slight quantity, for example, aluminium plate alloyed with 0.1% of titanium has a remarkable effect. Without limiting to titanium, metal such as tungsten has almost equal action and can be employed within the extent of 0.1% to 0.5%.

What I claim is:

A sound recording disk of an aluminum alloy containing a metal selected from the group consisting of 0.01% to 0.3% titanium and 0.1% to 0.5% tungsten and an anodic oxide film coating thereon.

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