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METHOD AND DEVICE FOR PRODUCING WAX RIBBONS FOR MECHANICAL SOUND RECORDING
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Fig. 2.

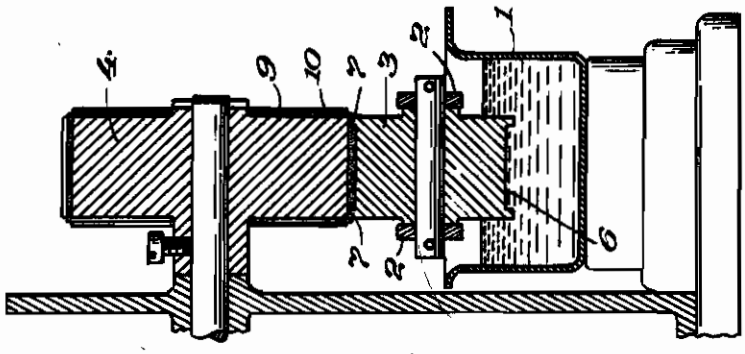
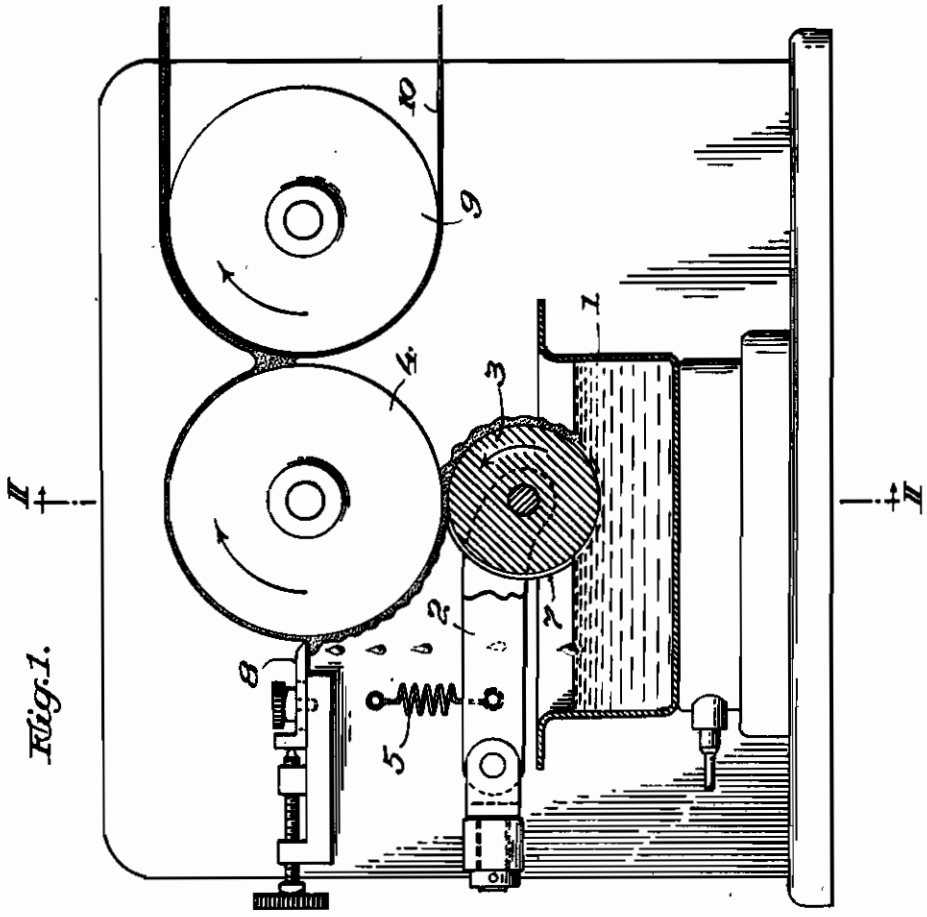


Fig. 1.



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ALIEN PROPERTY CUSTODIAN

METHOD AND DEVICE FOR PRODUCING WAX RIBBONS FOR MECHANICAL SOUND RECORDING

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The invention relates to a method for producing wax ribbons for mechanical sound recording purposes by coating a ribbon-shaped carrier with a wax layer capable of being cut, as well as to a device for carrying out this method.

It is known to deposit thin layers of an insulating substance upon ribbon-shaped carriers, for example film bands. Thus, in the production of films, a method is used in which the photographic emulsion of the film band is coated with a thin layer of paraffin. The device used for this purpose materially consists of a set of rollers taking up the liquefied paraffin and transferring it to the gelatine layer of the film by drawing the film, against the direction of rotation, over the continuously rotated roller carrying the paraffin and being kept at a certain temperature, a certain pressure being required for uniformly transferring the paraffin to the gelatine layer.

Slight deviations in the thickness and uniformity of such a layer are, however, admissible, as in the mentioned method it is exclusively the question of depositing an insulating coating upon the carrier of the photographic picture in order to protect it against chemical actions.

It is a considerably more difficult task if, instead of the simple insulating coating, a wax layer of such a thickness and composition and of such a uniformity is to be deposited upon a ribbon-shaped carrier as to render it suitable for mechanical sound recording. The wax compositions used for this purpose have such a high melting point that the ribbon must be prevented from touching the transferring roller, which is kept at a corresponding temperature, as the ribbon, whether it consists of a film or of paper, will be at least deformed, if not destroyed, by heat. Moreover, it is exceedingly difficult to absolutely avoid the formation of air bubbles in depositing the wax, such air bubbles rendering a wax-coated ribbon unsuitable for sound recording. Owing to this difficulty, devices have not been known hitherto for depositing an absolutely homogeneous and uniformly thick wax layer, capable of being cut, upon a ribbon-shaped carrier of any desired length.

The object of the invention is to obviate these difficulties. This is achieved, in the first place, by continuously feeding the liquid wax composition in a layer of uniform thickness to the ribbon shaped carrier moved at a uniform speed, and by damming the flow of liquid by means of the ribbon-shaped carrier, preventing direct contact between the said carrier and the wax feeding element.

If the wax composition is fed to the ribbon-shaped carrier by means of a roller, the retaining of the flow of liquid will cause an accumulation of wax filling the space between the ribbon and the roller, which accumulation may be termed as damming wave. The uniformity of the damming wave formed and kept as if in a state of rest while the wax coating process is going on, is attained according to the invention by keeping the thickness of the wax layer fed to the place of application below the thickness of the wax layer on the ribbon-shaped carrier and by accordingly increasing the rate of flow of the fed wax layer. The proportion between the rate of flow of the wax to the place of application and the linear speed of the ribbon-shaped carrier should, as thorough experiments have shown, preferably be made about 5 to 1.

In feeding the wax layer to the place of application by means of a roller, it is advisable to keep the thickness of the wax layer fed by the roller so small as not to exceed a few hundredths of a millimetre. Furthermore, the velocity of rotation of the feeding roller is preferably kept below the empirically determined critical velocity at which the wax layer has the tendency to accumulate on the central portion of the roller.

The space between the ribbon-shaped carrier and the feeding roller, the velocity of this roller and of the ribbon, and the thickness of the wax layer fed by the roller should be adjusted so that, in the final result, a complete consumption of the wax fed without air bubbles is made possible by a most uniform application to the running ribbon without the ribbon touching the roller.

The device for practising the method according to the invention preferably consists of a set of rollers with one bailing roller, one feeding roller, and one ribbon conveying roller, the feeding roller and the ribbon conveying roller being driven in the same direction of rotation but at different circumferential velocities.

The bailing roller is preferably driven by the feeding roller, the bailing roller being pressed by a spring or a weight against the circumference of the feeding roller.

However, in order that a wax layer of appreciable thickness may be deposited upon the feeding roller, the invention provides that the bailing roller has a groove-shaped cross section at its circumference and is arranged with respect to the feeding roller in such a way that only its edge

ribs touch the circumference of the feeding roller.

A device according to the invention is illustrated by way of example in the accompanying drawing, in which:

Fig. 1 is a diagrammatical side view of the invention,

Fig. 2 is a section of the device taken on the line II—II of Fig. 1,

The wax composition is liquefied in a heated crucible 1. A roller 3, hereinafter called bailing roller, mounted to rotate on an arm 2 pivotally connected by a universal joint, partly dips into the melted substance and is rotated by a mechanically driven roller 4. A spring 5, attached at one end to the arm 2 and at the other end to a stationary part of the device, draws the bailing roller 3 towards the circumference of the roller 4. As will be seen from Fig. 2, the bailing roller 3 is provided at its circumference with a rather wide groove 6, the depth of which is so dimensioned that a sufficient quantity of the wax composition will be permitted to pass between the rollers 3 and 4 and will be supplied to the roller 4. The edge ribs 7 touch the straight generatrix of the roller 4.

The bailing roller 3 in its rotation takes up wax from the crucible 1 and transfers it to the upper roller 4 which is preheated by suitable means, for example by electricity, sufficiently that the melted substance should not cool on the surface of this roller. The wax layer deposited upon the roller 4, hereinafter called feeding roller, is partly removed by an adjustable knife-shaped stripping plate 8 and returned into the crucible. The rest of the wax layer remaining on the feeding roller is free from bubbles and partakes completely uniformly in the rotation of the feeding roller.

A roller 9, arranged opposite the feeding roller 4, serves to convey the ribbon 10 to be provided with the wax layer. The ribbon conveying roller 9 is adjustable with respect to the feeding roller 4, and both rollers turn in the same direction. In operating the device, the ribbon conveying roller is moved towards the feeding roller by means of a suitable shifting device so far as to cause the wax layer to slightly touch the ribbon arriving in opposite direction whereby the liquid wax is dammed, thus ensuring the uniform transfer of the melted substance to the ribbon.

The best results are obtained if, by means of the stripper 8, the thickness of the wax layer is reduced to a few hundredths of a millimetre, and if the circumferential velocity of the feeding roller 4 is considerably increased with respect to the running speed of the ribbon so that the circumferential velocity of the roller 4 and the running speed of the ribbon are in the proportion of about 5 to 1.

Although the formed damming wave is of a high temperature, the arriving and not pre-heated ribbon is able to resist the heat rays without any difficulties since this heat radiation is only for a short time, and distributing and carrying off the heat is possible to a great extent if there is no direct contact with the central roller 4 which has a high temperature and constantly keeps it.

Furthermore, it was found that the operating speed of the device is limited by the fact that the wax layer, if the roller 4 rotates too quickly, has the tendency to accumulate to an elevation in the centre of the roller, whereas the edges of the roller are nearly free from wax.

The optimum operating speed is easily found by experimenting, if regulating means are provided for the driving motor. It has also been found to be advantageous to operate strippers at the roller 4 in such a way that any wax adhering to the sides of the roller is also returned into the crucible, as it would otherwise lead to thickening of the edges of the layer.

Finally, it was found advisable to make the width of the wax rollers 3 and 4 a little smaller than the width of the ribbon to be coated with the wax. The object of this is to prevent the liquid wax from running over the edges of the ribbon.

RICHARD RUHNAU.