(No Model.)

T. A. EDISON.

METHOD OF MAKING PHONOGRAM BLANKS.

No. 437,427. Patented Sept. 30, 1890.

Fig. 1.

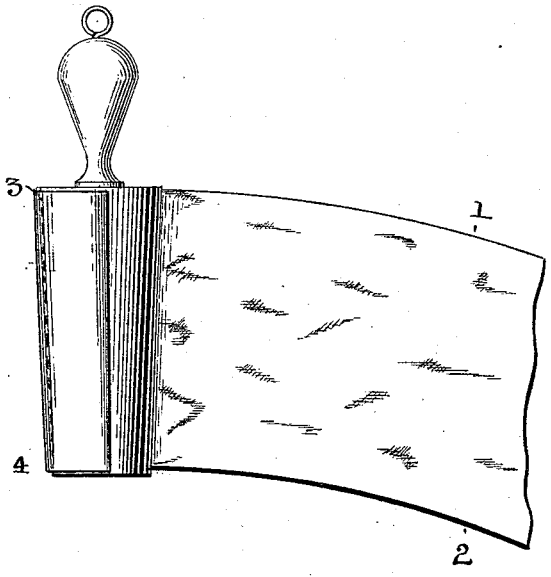


Fig. 2.

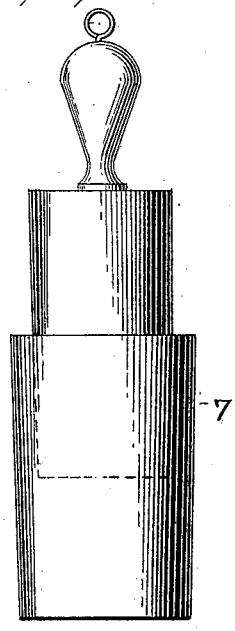


Fig. 3.

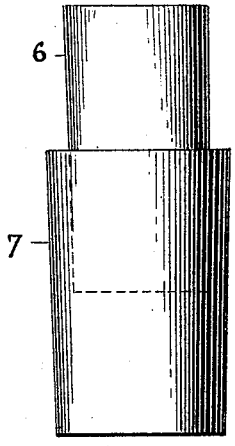
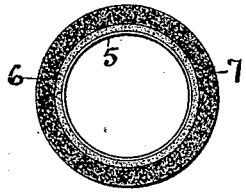


Fig. 4.



WITNESSES:

Norris A. Clark

Charles M. Cattin.

INVENTOR

Thomas A. Edison,

BY

Dyer & Seely.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF ORANGE, NEW JERSEY.

METHOD OF MAKING PHONOGRAM-BLANKS.

SPECIFICATION forming part of Letters Patent No. 437,427, dated September 30, 1890.

Application filed February 17, 1890. Serial No. 340,789. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Orange, in the county of Essex and State of New Jersey, have invented an Improvement in Methods of Making Phonogram-Blanks, (Case No. 852,) of which the following is a specification.

My invention relates particularly to that class of phonogram-blanks which are designed for repeated use—that is, blanks which, when they have once been used, have their outer surfaces shaved off and are then in condition to be used again. In this class of phonogram-blanks the recording substance is of considerable thickness.

The object of my invention is to simplify the construction of phonogram-blanks, to make them more durable, and especially to so construct them that they shall not crack by reason of expansion and contraction due to large changes in temperature to which they are often subjected.

In the use of phonogram-blanks as heretofore constructed it has been found that there was a great tendency to crack in cold weather, owing to contraction of the material composing the cylinder; but by the construction which is hereinafter described this tendency is remedied.

My invention consists in the method of making the support or backing for phonogram-blanks.

My invention also consists in the method of making the outer recording cylinder or blank.

My invention also consists in the method of uniting the backing or support and the outer cylinder.

In the accompanying drawings, Figure 1 illustrates the method of making the backing or support for the recording-surface. Fig. 2 illustrates the method of making said recording-surface. Fig. 3 shows the central cylinder partially in place within the recording-cylinder. Fig. 4 is a cross-section of a completed phonogram-cylinder.

The phonogram-blank consists of a central tube 5, of paper or other tough or fibrous sheet material, a layer of paraffine 6 or similar material thereon, and an outer layer 7 of the substance which constitutes the record-receiving surface. The object of the central tube is primarily to form a tough support for the outer cylinder which will prevent breakage of the same in placing it on the phonogram cylinder or carrier or by accidental jarring to which it may be subjected.

I will first describe the paper tube and the method of making the same. This tube should be slightly tapering, as is well understood in the art, and to produce such taper I wind the strip from which the tube is made on a mandrel which has a slight taper. The strip has a width equal to the length of the cylinder desired, and it is evident that if the two edges were of equal length the strip would not wind on the tapering mandrel evenly, by reason of the greater circumference at one end than at the other end of the mandrel. To obviate this difficulty I cut the strip from the circumference of a circle the radius of which will depend on the amount of taper required. In practice I have used paper cut from a circle of twelve feet radius. Fig. 1 of the drawings indicates the curved form of the strip, the curve being largely exaggerated. The outer edge 1 of said strip is a segment of the periphery of the circle, and the edge 2 is a segment of a circle whose radius is equal to twelve feet minus the width of the strip. The edge 2 will therefore be shorter than the edge 1; but the lengths of edges 1 and 2 bear the same relation to each other that the circumference of the mandrel at 3 does to the circumference at 4. Hence as the strip is wound one or more times around it lies flat and even on the mandrel. When a tube of sufficient thickness is produced, the paper strip is cut off and its end cemented to prevent uncoiling by means of a composition consisting of glue and glycerine, or other suitable adhesive substance. As seen from Fig. 1, the strip is formed with its ends cut substantially on radial lines, in order that the tube formed may have the same number of thicknesses of paper throughout its entire body and may fit evenly and snugly on the phonogram-cylinder with which it is used. Only a portion of the strip being shown in the figure, one end only appears cut, as indicated. The tube or cylinder thus formed is then soaked in a waterproofing material—such, for example, as paraffine at a high heat—to render it moisture-proof, and is allowed to cool, after which it is slipped onto a cold mandrel and dipped into melted paraf-

fine or some analogous material whose coefficient of expansion is about twice that of the material constituting the recording-surface, and held long enough to gather a coating of considerable thickness. The mandrel and coating are then removed, and when the latter is sufficiently cool it is placed in a lathe and turned down to the desired size, a slight taper being given to the surface.

The method of making the outer or recording cylinder is as follows: A cold mandrel—that is, preferably about the temperature of the amosphere, slightly larger than that on which the paper was wound—is covered with an oil—such as castor or olive oil—and is dipped in a bath of the material which is to constitute the outer or record-receiving cylinder, and is held there for a short time. The mandrel being cold, the material chills thereon. When a sufficient thickness has formed on the mandrel—say two or three times the thickness of the coating on the paper tube—it is taken out and allowed to cool; but before it has cooled sufficiently to cause the coating to stick to the mandrel said coating is slipped off. This is easily done by reason of the lubrication of the mandrel. Before being removed, however, the ends of the cylinder are trimmed down with a knife or otherwise to remove superfluous material. The recording-cylinder is then allowed to further cool and is turned down in a lathe to the proper size, and its outer surface is made a true cylinder. The central and the recording cylinders are now ready to be united to form the completed phonogram-blank. The two cylinders are so proportioned that cylinder 7 will slip over cylinder 6 about two-thirds or three-fourths of its length, as shown in Fig. 3, when both are at a normal temperature. The cylinder 7 is heated, whereby it is expanded, and is then readily slipped over cylinder 6, and when it contracts on cooling is firmly held in place.

In a phonogram-blank constructed as above described the outer layer, which is quite fragile and liable to crack or break, is always provided with a firm support, and said support, or the outer layer thereof, which, as before stated, has a larger coefficient of expansion than the material comprising the record-receiving surface, readily expands and contracts to accommodate and still to form a support for the latter cylinder.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The method of making a backing or support for a phonogram-blank, which consists in making a tube with a slight taper, soaking the tube in water-proofing material, dipping said tube in a material having a high coefficient of expansion to form a coating thereon, and finally shaving down the surface to the desired size and taper, substantially as described.

2. The method of making a phonogram-blank, which consists in dipping a lubricated mandrel into a liquid mass of the material which forms the recording-surface, and maintaining it therein until a sufficient thickness of the material is chilled thereon, removing the same from the mass and slipping the coating from the mandrel before it contracts sufficiently to adhere to the mandrel, substantially as described.

3. The method of making phonogram-blanks, which consists in forming a backing of tough material, covering the same with paraffine or similar material, making a recording-cylinder, and placing the recording-cylinder over the covered backing, substantially as described.

4. The method of making phonogram-blanks, which consists in forming a backing of tough material, coating the same with a material having a large coefficient of expansion, making a record-cylinder with its bore slightly smaller than the outer surface of the backing, heating the recording-cylinder to expand it, and slipping it over the backing, substantially as described.

This specification signed and witnessed this 8th day of February, 1890.

THOMAS A. EDISON.

Witnesses:
A. O. TATE,
THOS. MAGUIRE.