

(No Model.)

T. A. EDISON.
PHONOGRAM BLANK.

No. 406,576.

Patented July 9, 1889.

Fig. 1.

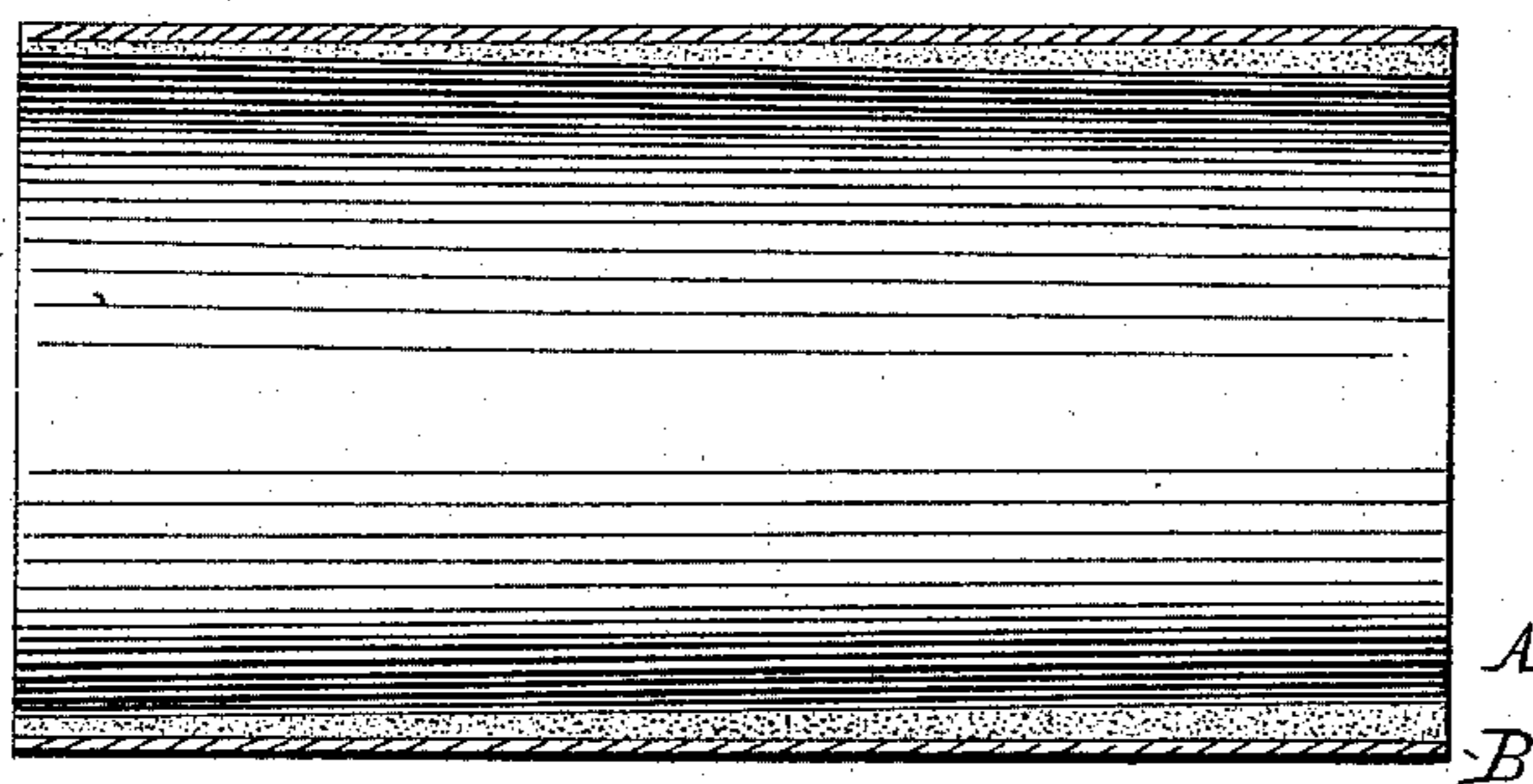
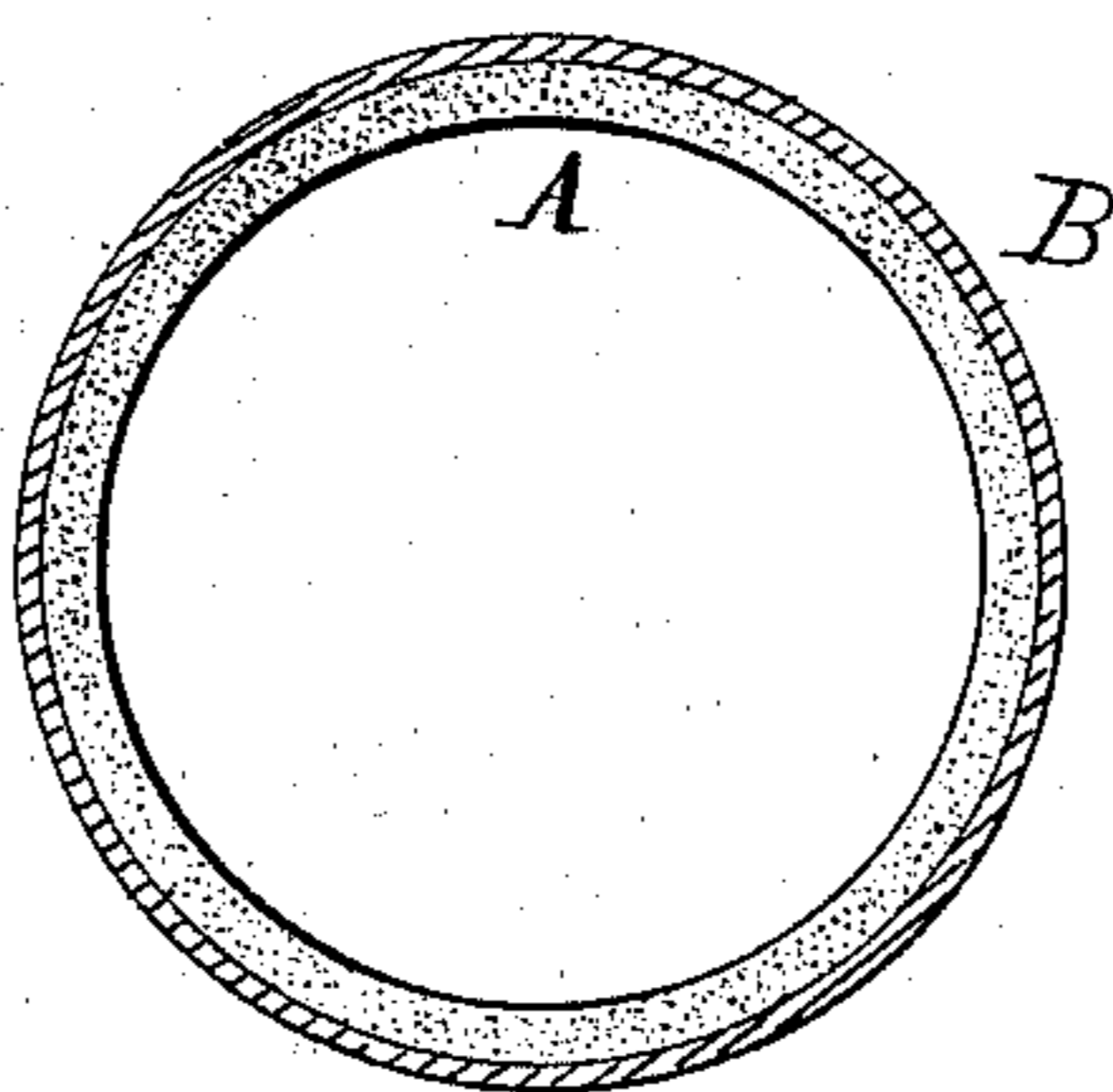


Fig. 2.



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THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

PHONOGRAM-BLANK.

SPECIFICATION forming part of Letters Patent No. 406,576, dated July 9, 1889.

Application filed February 16, 1889. Serial No. 300,514. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain
5 new and useful Improvement in Phonogram-Blanks, (Case No. 829,) of which the following is a specification.

My invention relates to that character of phonogram-blanks which consist of a base or back-
10 ing of one material, usually a molded material, and an outer surface or covering of another material, which receives the sound-record. Such outer recording material has usually heretofore been a material which is more or
15 less soft and pliable at ordinary temperatures; but I have found it better for the purpose of recording and reproducing sounds to employ a material which is hard and brittle at such temperatures. When such a material is em-
20 ployed, difficulty may arise in cases where the phonogram-blanks are exposed to extreme changes of temperature, because the non-pliability of the sound-recording material does not permit it to accommodate itself to
25 the expansions and contractions of the body of the blank, and so the outer material may become cracked. When the outer material is soft and pliable at ordinary temperatures, this difficulty does not usually occur, although it
30 may arise when an extremely low temperature is encountered.

The main object of my invention is to avoid this difficulty; but a further object is to produce a phonogram-blank which can be
35 cheaply and readily produced, and which will be effective in every way for the purpose of recording and reproducing sounds.

My invention consists, mainly, in constructing the two parts of the phonogram-blank—
40 that is to say, the core or backing and the outer covering of sound-recording material—of substances which have the same or practically the same coefficient of expansion under changes of temperature, whereby both
45 parts of the phonogram-blank are made to expand and contract equally, and the cracking of the outer-surface material does not occur.

I prefer to employ for the outer sound-recording surface a thin coating of a metallic
50 soap—such as stearate of soda—and for the core or main portion of the blank I prefer to

use asphalts or bitumens. Under these terms I refer not only to the natural asphalts—such as Trinidad, Cuban, Mexican, and Syrian asphalts—but also to the asphaltic residues
55 which are produced artificially in various commercial operations, such as asphalt pitch and hard coal-tar pitch. I find that the best results are produced by the use of Syrian asphalts; but this is more expensive than some
60 of the others, and I therefore prefer to use asphalt pitch, which is ordinary Trinidad asphalt from which the more volatile elements have been distilled. This substance is very
65 cheap, and is found to be very effective for the purpose. In making the phonogram-blank I prefer to mix with the asphalt or bitumen a small percentage of a material which in solidifying shrinks or contracts greatly,
70 such as certain waxes, and preferably carnauba-wax. The reason for this is, that when asphalt is melted and poured into molds it does not contract in hardening, and it is therefore difficult to get it out of the mold again. By mixing from five to seven per cent.
75 of carnauba-wax with the asphalt a compound is formed which shrinks slightly in hardening, and can therefore be readily removed from the mold.

Asphalts as found on the market vary in
80 the degree of heat required to melt them, and also in the degree of liquidity or mobility of the liquid which is formed by melting them. Some asphalts, even at very high temperatures, form a thick semi-liquid which is diffi-
85 cult to pour. This difficulty may be corrected by adding to the asphalt before melting a small quantity of a wax which has a low melting-point—such as Japan wax or ozocerite; or instead of this a liquid—such as crude
90 petroleum, turpentine, or melted rosin or tar—may be used.

In forming the phonogram-blanks, which I prefer to make in the shape of hollow cylinders having a tapering bore and a true cylin-
95 drical outer surface, I pour the melted mixture of asphalt, carnauba-wax, and softening material into a suitable mold, such mold having a cylindrical outer inclosure and a tapering inner core, such inner core being prefer-
100 ably first coated with paper, which will adhere to the asphalt cylinder and allow it to

be easily removed. I prefer to use a split mold, so that the cylinder can be readily removed from the mold. The outer coating, which, as stated, is preferably a metallic soap having the same coefficient of expansion as the asphalt compound employed, is preferably applied by dipping the asphalt cylinder after it has cooled into a bath of the melted material. When it is applied in this way, the surface may be afterward made true by turning it off in a suitable lathe after it has become cooled again. Instead of this, however, the external material may be also applied by molding, the asphalt cylinder being placed in a mold which is slightly larger than that first used and the covering material poured into such mold round the cylinder, so that it will adhere thereto and will form a smooth and true surface without the necessity of turning it off. My experience has been, however, that the first-mentioned method is the less expensive. There are other ways of forming the asphalt body than by melting and molding. The material may be powdered and subjected to heavy pressure in a suitable mold, so as to form it into the required shape, or it may be formed in a squirting-press—such as is used to make lead pipe—the melting material being forced through the opening in the press in a continuous tube and afterward cut into the desired lengths and then covered with the sound-recording material.

I find that the proportions of asphalt, carnauba-wax, and liquefying material necessary to produce a compound having the proper grade of expansion for the outer covering depends on the character and quality of the material and must be separately determined by experiment for each material used. In order to determine it, the three materials may be mixed in different proportions, the cylinders molded and dipped into the melted covering material, and when several cylinders of different proportions are produced in this way they may be placed in a chamber in which they are subjected to very low temperature. If the coefficient of expansion is not clearly the same, cracks will appear in the outer coatings, which will be more or less according to the proportions of material. This will show how closely the right proportions have been reached in each case, and in the second experiment it will be easy to proportion the ingredients so as to prevent cracking altogether with the particular materials used; but of course if other materials are used it will be necessary to repeat the experiment.

It will be seen that I am thus enabled to use as the sound-recording material a hard and brittle substance, and thus to make phonogram-blanks which are most effective for the recording and reproduction of sound, and at the same time the main portion of the blank is composed of a cheap and easily-worked material, and the blanks can therefore be cheaply and readily produced.

The accompanying drawings illustrate a cylindrical phonogram-blank embodying my invention.

Figure 1 is a longitudinal section of the cylinder, and Fig. 2 an end view thereof.

A is the inner body or core, and B the outer surface of sound-recording material.

What I claim is—

1. A phonogram-blank composed of a base and an outer recording-surface of different materials having the same or substantially the same coefficient of expansion, substantially as set forth.
2. A phonogram-blank composed of a base of one material and a sound-recording surface of a different material, which is of a hard and brittle nature at ordinary temperatures, the two materials having the same or substantially the same coefficient of expansion, substantially as set forth.
3. A phonogram-blank having, in combination, a base of asphaltic material and an outer covering of sound-recording material, substantially as set forth.
4. A phonogram-blank having, in combination, a base of molded material and an outer covering of material having the same or substantially the same coefficient of expansion, substantially as set forth.
5. A phonogram-blank having, in combination, a base of molded material and an outer covering of another molded material, the two materials having the same or substantially the same coefficient of expansion, substantially as set forth.
6. A phonogram-blank having, in combination, a base of asphalt mixed with a material which contracts greatly in solidifying, such as carnauba-wax, and an outer covering of sound-recording material, substantially as set forth.
7. A phonogram-blank having, in combination, a base of asphalt mixed with a liquefying material, and an outer covering of sound-recording material, substantially as set forth.
8. A phonogram-blank having, in combination, a base of asphalt mixed with a material which contracts greatly in solidifying, such as carnauba-wax, and also with a liquefying material, and an outer covering of sound-recording material, substantially as set forth.
9. A phonogram-blank having an outer surface of metallic soap and a base of another material having the same or substantially the same coefficient of expansion, substantially as set forth.
10. A phonogram-blank having a base of asphaltic material and an outer surface of metallic soap, substantially as set forth.

This specification signed and witnessed this 1st day of February, 1889.

THOMAS A. EDISON.

Witnesses:

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