106. COMPOSITIONS,
COATING OR PLASTIC.

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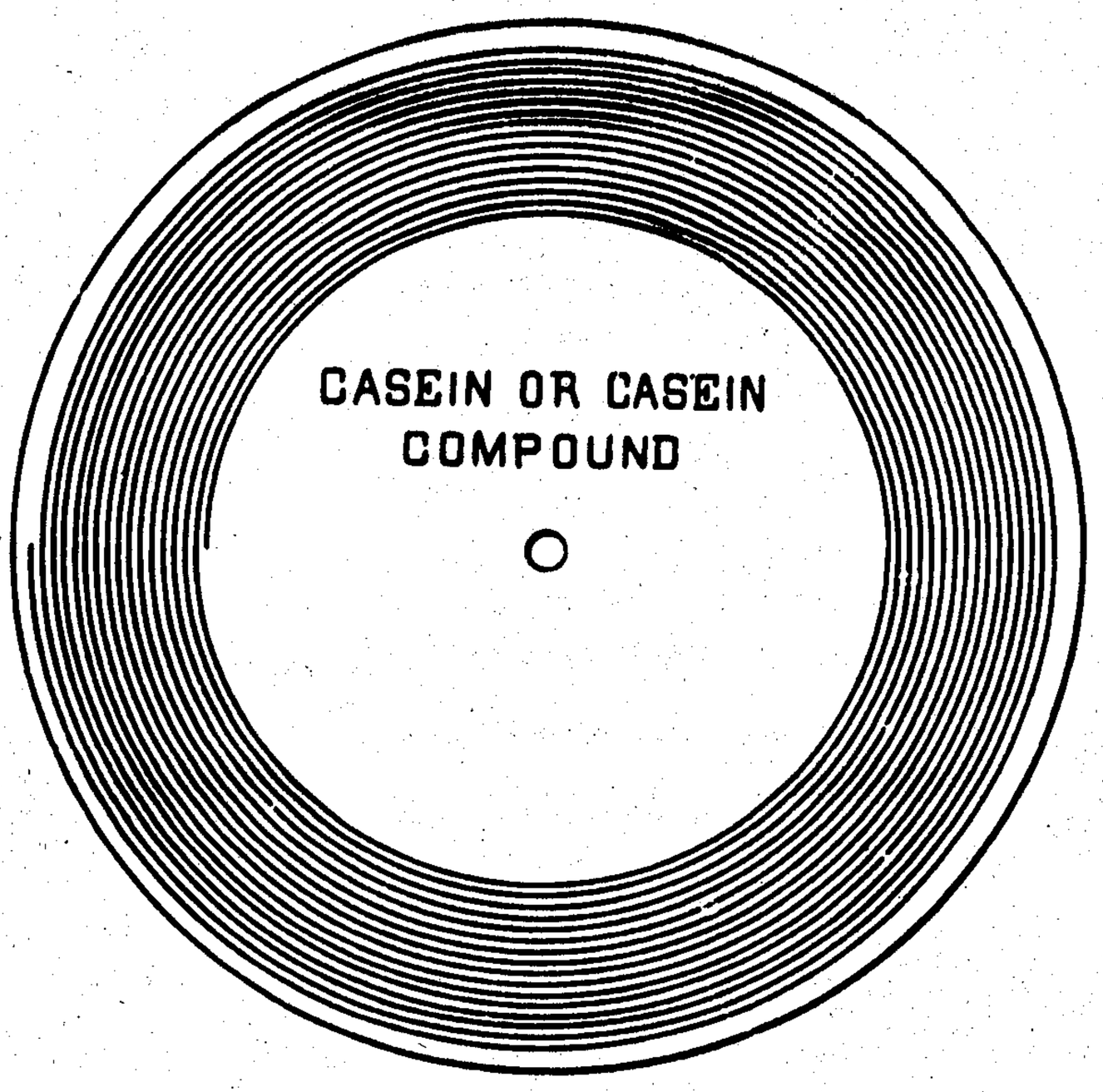
Draftsman.

No. 840,932. PATENTED JAN. 8, 1907.

B. B. GOLDSMITH.

SOUND RECORD TABLET.

APPLICATION FILED DEC. 13, 1906.



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UNITED STATES PATENT OFFICE.

BYRON B. GOLDSMITH, OF NEW YORK, N. Y.

SOUND-RECORD TABLET.

No. 840,932. Specification of Letters Patent. Patented Jan. 8, 1907.

Application filed December 13, 1906. Serial No. 347,676.

To all whom it may concern:

Be it known that I, BYRON B. GOLDSMITH, a citizen of the United States, and a resident of New York, in the county and State of New York, have invented certain new and useful Improvements in Sound-Record Tablets, of which the following is a specification.

My invention has reference to improvements in sound-record tablets, known in the art as "phonograph," "graphophone," and "gramophone" tablets, the object of the invention being the production of such tablets of a new composition of matter which possesses characteristics that particularly adapt the same for the making of sound-record tablets.

Heretofore commercial sound-record tablets have been made primarily of beeswax, afterward of mineral waxes, metallic soaps, hard rubber, celluloid, and shellac, and with all or with most of these substances have been mixed, and particularly with shellac, other substances in a finely-divided state. In these tablets the record-grooves were according to the nature of the material employed, either cut by a suitable recording-style or were produced by transfer pressure from a suitably-prepared matrix. The cutting of a record-groove in record-tablets that are used for reproduction only has become largely obsolete, and it is now almost the universal practice to produce these record-grooves by transfer pressure from a matrix. For this purpose the record material must be moldable when the transfer is made and must then become hard and non-plastic. The materials now used are generally of a character that they become plastic when heated and hard at ordinary temperatures—that is to say, they are thermoplastic. Shellac, with admixtures of a variety of compounding materials, is the material which is most largely used, particularly in sound-record tablets of the gramophone type; but the price of shellac has more than doubled in recent years, and the cost of the tablets has increased in proportion.

My new composition for the manufacture of sound-record tablets consists of casein, either alone or with suitable admixtures, and a number of different methods can be used for working the casein into a mass into which the sound-record groove can be produced by transfer pressure from a suitable matrix. The most primitive method consists in taking the casein, slightly moistened, and subjecting it to heat and pressure under the matrix. Another method is to treat casein with solutions of borax or alkalies and working up the mass in such shape that the record-groove can be pressed into it by a matrix; but I have discovered a particular method of working casein into a sound-record tablet, which renders the manufacture much easier and the product much better, as will presently appear.

I have found that by mixing certain ingredients with casein I can produce a composition which when heated softens to any desired degree, so that when a tablet is formed of that new composition it will receive a sound-record groove by transfer pressure from a matrix with the greatest ease. I have called these new casein mixtures "thermoplastic casein," and I have given the name "converting agents" to the substances which give the casein the valuable property of thermoplasticity. Some of the agents which I have found to convert casein into a thermoplastic state are alpha-naphthol, beta-naphthol, benzoic acid, carbolic acid, hydrochinon, kresol, pyrocatechin, resorcin, salicylic acid, and urea.

There are other substances which act as converting agents on casein, and I am not limited to the agents which I have enumerated, although these yield good results. The thermoplastic casein can be used for the formation of sound-record tablets in its pure state, and it can be mixed with other materials, such as are used as admixtures to shellac, in the production of gramophone-record tablets. It can be given any desired color, and it can be mixed with shellac.

The tablets may be made flat, disk shape, cylindrical, or of any other desired form, and they can be made all throughout their whole mass of thermoplastic casein, or this material may be applied in a thin layer, either in a fluid or plastic state, upon a base of any kind.

Casein in any of the forms in which I employ the same is much cheaper than shellac or shellac compounds or any other sound-record material known to me.

The degree of hardness attained by the product in the cold state varies with the kind of converting agent employed, and ordinarily the new composition will be softer in the cold state and more plastic when heated when a quantity of converting agent is employed. Liquid converting agents will ordinarily give a softer product than solid ones, and

when a liquid converting agent is used in sufficient quantity the new compound can be made with any degree of pliability and flexibility in the cold. This same result can be obtained by the use of a solid converting agent with the addition of a liquid which is not antagonistic to the mixture, such as glycerin.

I am thus enabled to vary the hardness and thermoplasticity of the new sound-record material throughout a very wide range by using different converting agents or by employing several converting agents together and in various proportions and by using different amounts of crude casein or casein compound. In this manner I have made converted casein that became plastic by a moderate heat and others that require the heat of steam at eighty pounds pressure to become plastic.

A characteristic of some of the converting agents upon which the continued thermoplastic property of the new composition depends is their tendency to remain in the compound and not to volatilize to any marked degree. Altogether the converting agents behave with respect to and act upon the casein in a similar manner as camphor upon nitrocellulose in the formation of celluloid. Nitrocellulose itself is not plastic, but becomes so when mixed with camphor.

In the practical manufacture of my new sound-record material the casein may be united with the converting agent on and between suitably-heated rolls, the same as nitrocellulose and camphor are united in the manufacture of celluloid. Any method, however, will answer by which the casein is brought into intimate contact with the converting agent, whether or not heat and pressure be employed.

Instead of using the converting agents in their natural state I can with advantage first dissolve them in alcohol or water or other suitable liquid. A liquid which readily evaporates is advisable.

No definite proportions of the ingredients can be or need be stated, since a wide range of proportions is permissible, depending upon the degree of hardness and thermoplasticity aimed at. One of the numerous practical proportions which I have used and the manner of procedure employed is the following: I have used three pounds of dry casein, one-half pound of beta-naphthol, and one pint of alcohol. The naphthol was first dissolved in the alcohol, and the solution was sprinkled upon the casein so as to thoroughly moisten the same. The mass was then kneaded between moderately-heated rolls until it became uniform throughout. In this condition the mass was then rolled out into sheets or formed into tubes, and these sheets or tubes remained flexible at ordinary temperatures until the alcohol had evaporated, when they became hard at ordinary temperatures, but quite plastic when heated.

It will be readily understood that large quantities of compounding materials or admixtures can be kneaded in with the casein on the rolls, the same as is done in the manufacture of rubber and celluloid. More particularly is it practicable to knead into the mass scraps of waste celluloid, finely-divided horn, rubber, resins, gums, and coloring-matter, and in this manner a great variety of converted-casein compounds can be produced each having a peculiarity of its own. Glycerin may also be mixed into the mass for rendering the product more flexible. The sheets as they come from the mixing-rolls or calenders may with advantage be pressed between heated plates to complete the conversion.

Instead of using casein alone or casein with such admixtures as above broadly indicated for the production of converted casein or converted-casein compounds I may use any of the derivatives of casein known in the arts, such as the compounds of casein, with acids, bases, and salts, and I wish it to be understood that by the term "casein" I mean to include the derivatives of casein, since I have found the latter to act similarly to the pure casein.

The thermoplastic casein made as hereinbefore described can be used immediately as the material for a sound-record tablet; but when greater hardness of the tablet is required it is necessary to embody in the mass of the thermoplastic casein such substances as baryta, infusorial earth, powdered glass, or silicates in any other finely-divided form, or metallic oxids, especially the native oxid of iron, or corundum, or carborundum. In short, all the admixtures which are ordinarily used with shellac in the production of gramophone-record tablets may be incorporated in the thermoplastic casein by kneading them, or any of them, into the mass either during the process of conversion or after the conversion.

In the accompanying drawing I have, by way of example, illustrated a sound-record tablet in the form of a disk, which may be made of my improved record material; but the tablet may have any other suitable form and need not be made solidly of the new material, as hereinbefore described. The sound-record groove may be pressed into the mass by a matrix just as it comes from the mixing-rolls, so that the tablet is formed by the same pressure which impresses the sound-groove, or the tablet may be first roughly formed and allowed to harden, and the sound-record may then be impressed at any time thereafter by first heating the blank tablet to render it soft and moldable.

Altogether my new sound-record material may be manipulated and applied like every

other thermoplastic material—such, for instance, as shellac and its compounds.

By the term "sound-record tablet" hereinbefore employed I designate not only the tablet with the sound-groove impressed therein, but also the tablet when it is still a blank but otherwise ready to receive a sound-record. Therefore a simple disk or a simple cylinder with no sound-groove impressed thereon is understood to be a sound-record tablet if the size and shape of the disk or cylinder or differently-shaped structure is such as adapts the same to receive a sound-groove.

Having now fully described my invention, I claim and desire to secure by Letters Patent—

1. A sound-record tablet having a record-surface of casein.

2. A sound-record tablet having a record-surface of casein composition.

3. A sound-record tablet having a record-surface of thermoplastic casein, substantially as described.

4. A sound-record tablet having a record-surface of a mixture of thermoplastic casein and compounding materials, substantially as described.

5. A sound-record tablet having a record-surface composed of casein and beta-naphthol or its equivalents, substantially as described.

6. A sound-record tablet having a record-surface composed of casein, beta-naphthol or its equivalents, and compounding materials, substantially as described.

7. A sound-record tablet of casein.

8. A sound-record tablet of casein composition.

9. A sound-record tablet formed of thermoplastic casein.

10. A sound-record tablet formed of a mixture of thermoplastic casein and compounding materials, substantially as described.

11. A sound-record tablet composed of casein and beta-naphthol or its equivalents, substantially as described.

12. A sound-record tablet composed of casein, beta-naphthol or its equivalents and compounding materials, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

BYRON B. GOLDSMITH.

Witnesses:
G. A. GOLDSMITH,
R. GOLDSMITH.