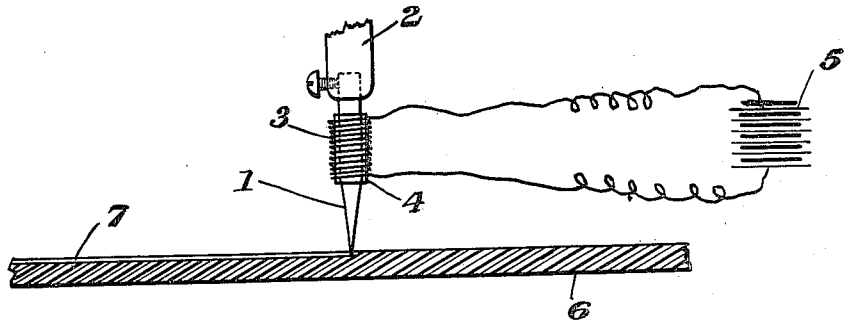
V. H. EMERSON.

METHOD OF PRODUCING SOUND RECORDS.

APPLICATION FILED JUNE 19, 1915.

1,271,684.

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WITNESSES:

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METHOD OF PRODUCING SOUND-RECORDS.

1,271,684. Specification of Letters Patent. Patented July 9, 1918.

Application filed June 19, 1915. Serial No. 34,990.

To all whom it may concern:

Be it known that I, VICTOR HUGO EMERSON, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Methods of Producing Sound-Records, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

My invention relates to the production of sound records and has for an object to provide an improved method whereby more efficient and accurate registration of sound vibrations may be obtained.

In making commercial records for reproducing musical and other tones, recording stili have been used in various forms with a view to reducing the highly objectionable frictional resistance to the vibratory action of the stylus as it is recording in the solid or semi-solid material upon which such records are formed. To this end peculiarly shaped needle points have been employed for tracing grooves, some of which were formed with specially designed cutting edges. Likewise numerous methods have been resorted to for softening the material while being operated upon, in the effort to obtain a record having undulations accurately corresponding in amplitude and frequency to the sonorous vibrations to be recorded thereby. This softening process has been accomplished in different ways, some applying heat to the record blank immediately in advance of the stylus, and I am aware that an attempt to accomplish the same result by applying moderate heat to the stylus itself, has been made. However, none of the means or processes used for the purpose indicated, as I am aware, has succeeded in eliminating entirely the frictional resistance referred to. This I have accomplished completely, and in attaining to the desired end in practising my present invention, I employ a high degree of heat, applied to the so-called cutting stylus while it operates upon a record blank of some suitable material, preferably a hard volatile composition such as xylonite, or as it is more familiarly known in the arts, commercial celluloid.

The precise degree of heat necessary is easily determined by the operator having reference to the character of the medium operated upon, it being deemed necessary only to specify that the needle accomplishes the work best for most substances when brought to a red glow or to incandescence. When the stylus is made of platinum the nature of the metal is such as to withstand the oxidizing effects of the higher temperatures and in that case the incandescence can easily be maintained with satisfactory results. Therefore, with the stylus heated to the extent indicated, the work of removing the waste material by volatilization or sublimation, or by the two processes conjointly, is entirely performed by the thermal energy transmitted through the needle point and is accomplished practically instantaneously, so that the vibratory action of the stylus along the surface of the record blank is absolutely free and untrammeled.

In using my process any convenient means or method for heating the stylus may be employed in producing the required degrees of thermal force. I have found that an electric current passing through a high resisting coil wound about the body of the needle immediately above the point thereof, but insulated from the stylus bar, is highly convenient to use in connection with the improved process of my invention, the stylus itself preferably being made of some well known metal possessing a high fusion point, such for example as platinum, iridium and others of the platinum class.

It is obvious that in having the needle thus heated to a sufficient degree when being depressed into the substance of the record blank, it will consume or volatilize the portion with which it comes into immediate contact, as pointed out, and continue thus to transform the material of the record blank, thereby tracing a groove therein as the latter is drawn across the point of the needle, making in the process a clean-cut groove, that is, one the surface edges of which are free from burs or bulged portions to interfere with the subsequent uses to which the record is usually adapted.

Various suitable materials may be used for the record blank, as indicated, the temperature of the recording needle in each being brought to the degree of heat required for burning out or volatilizing the particular substance to which it pertains at the required speed at which it is fed to the needle. In connection with the records commonly in use it will be necessary to use a stylus having a relatively fine point and

in such case the more readily the substance of the record blank may be disintegrated the higher the efficiency of this method for producing records. I therefore prefer to use celluloid as referred to above, for the reason, among other considerations, that all of the elements which enter into its composition are most readily consumed with the moderately high degree of heat that can be maintained in a small point of platinum or similar metal.

Therefore, generically described, my process comprises as its more important features, firstly, the use of a needle of suitable material such as platinum, irridium or similar metal, heated to a high point preferably by application of electricity in the usual manner in which the electric force is converted into heat; and secondly, suitable material for pyrographic action, preferably a hard volatile material such as xylonite.

The accompanying drawing shows in elevation a partial view of a sound recording instrument with its stylus surrounded by a resistance coil and in process of forming a record groove in a disk blank.

Referring to the accompanying drawing, the numeral 1 represents the stylus which is preferably made of a metal possessing a high fusible point, around which is wound an electric conductor of high resistance, 3, separated from the needle by the insulating bushing 4 and having in connection therewith the battery cells 5 to supply the electric current which of course may be from any source of electric energy.

The stylus 1 is shown in the illustration in connection with the arm 2 in partial view as part of a sound recording device, not shown, which may be any of the familiar types now used. In the illustration the zigzag form of undulatory sound groove 7 is represented in connection with my process. It is obvious, however, that equally satisfactory results are attainable by the use of the vertically operated type of stylus.

The material which I use for the record blank 6 as a preferred form of chemical composition which has been referred to above, is xylonite, or, as it is commercially known, celluloid, and I also preferably use the disk of the flat type as shown, which as it rotates receives the sound groove in the familiar spiral or involute form.

Having described my invention, what I claim is:

1. The herein described method of producing a sound record in a solid volatile material by volatilizing portions thereof to form an undulatory groove therein, wherein the material removed in forming the groove is entirely removed by volatilization.

2. The herein described method of producing a sound record in a solid material composed of volatile and pyrographic elements by volatilizing and sublimating a portion thereof to form an undulatory groove therein, wherein the material removed in forming the groove is entirely removed by volatilization.

3. The herein described method of producing a sound record which consists of preparing a blank of volatile material, and burning therein a record groove by means of a suitable thermal stylus, wherein the material removed in forming the groove is entirely removed by volatilization.

4. The herein described method of producing a sound record which consists of preparing a blank of volatile material and burning therein a record groove by means of a thermo-electric stylus, wherein the material removed in forming the groove is entirely removed by volatilization.

5. The herein described method of producing a sound record which consists of preparing a blank of volatile material and burning therein by means of a suitable thermal stylus, a record groove of substantially even depth, having lateral undulations corresponding to sound waves, said groove having been formed entirely by volatilization.

6. The herein described method of producing a sound record, which consists of burning an undulatory groove in the solid pyrographic material composing a sound record blank, said groove having been formed entirely by volatilization.

7. The herein described method of producing a sound record, which consists of inscribing an undulatory groove in a solid volatile material by means of a diaphragm operated thermal stylus, having sufficient heat applied to said stylus to displace by volatilization the contents of the groove made thereby, wherein the material removed in forming said groove is displaced by volatilization.

8. The herein described method of producing a sound record, which consists of inscribing an undulatory groove in a solid volatile material by means of a diaphragm operated thermal stylus, having sufficient heat applied to said stylus to displace entirely partially by volatilization and partially by sublimation the contents of the grooves made thereby.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

VICTOR HUGO EMERSON.

Witnesses:
ANNA W. DILLMAN,
EDITH ENNISSON.