

No. 689,350.

Patented Dec. 17, 1901.

E. BERLINER.

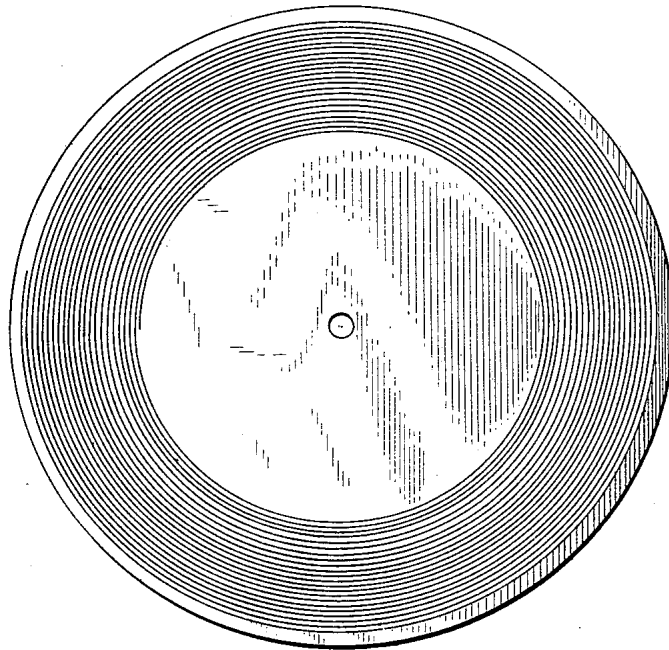
SOUND RECORD AND METHOD OF MAKING SAME.

(Application filed July 26, 1898.)

(No Model.)

2 Sheets—Sheet 1.

*Fig. 1*



*Fig. 2.*



*Witnesses:*

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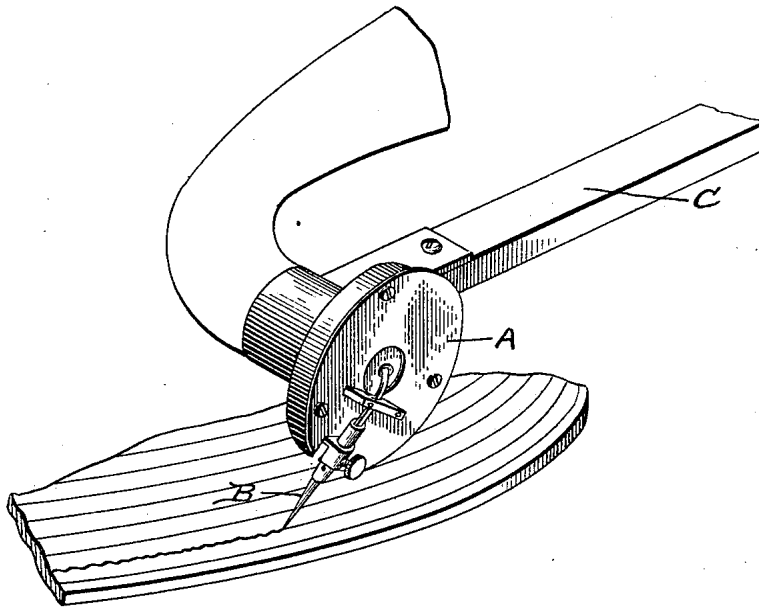
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2 Sheets—Sheet 2.

*Fig. 3.*



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*J. M. Fowler Jr.*  
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# UNITED STATES PATENT OFFICE.

EMILE BERLINER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO  
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## SOUND-RECORD AND METHOD OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 689,350, dated December 17, 1901.

Application filed July 26, 1898. Serial No. 686,951. (No model.)

*To all whom it may concern:*

Be it known that I, EMILE BERLINER, a citizen of the United States, and a resident of Washington, in the District of Columbia, have  
5 invented certain new and useful Improvements in Sound-Records and Methods of Producing the Same, of which the following is a specification.

The object of my invention is to increase  
10 and extend the usefulness of gramophonic apparatus and to add another method of producing gramophonic records to those heretofore known. By my invention, in fact, I place it  
15 within the power of persons unskilled in the art of making sound-records to produce records of their own, and this without the use of other machinery than that which they are already supposed to possess for the purpose of reproducing such records. Thus, for instance, my invention renders it possible for  
20 the owner of a gramophone-machine, which can now be purchased in the open market at a moderate price, but can ordinarily be used for reproducing purposes only, to make a  
25 record of business-letters, contracts, musical selections, and the like by means of said machine, thus using the gramophone as a recording-machine, and to thereafter translate such records into sound by the same apparatus  
30 which has been used to produce it.

To these ends my invention consists in the method of forming a preliminary groove in a gramophone-tablet and thereafter superposing the sound-record upon this groove;  
35 and my invention furthermore consists in the gramophone-tablets thus formed.

In the drawings, Figure 1 shows the gramophone-tablet with a preliminary groove formed therein, and Fig. 2 shows a portion of  
40 said groove as it appears after the sound-record has been superposed thereon. Fig. 3 shows a view of the recording-stylus and tablet.

In the practice of my invention I may start  
45 with the usual zinc plate covered with an etching-ground, as is commonly used in this art. This plate I place in any type of engraving-machine which can cut a smooth line or groove upon the face of the plate, the  
50 shape of groove usually employed being that

of a spiral. By preference I use for this purpose the recording-machine patented to me on September 19, 1895, under No. 534,543—that is to say, I place the zinc plate, covered with an etching-ground, in this machine, with  
55 the recording-stylus in position, and start the machine in motion, without, however, actuating its diaphragm by sounds uttered in the vicinity. In consequence the etching-ground of the plate will be removed along a smooth spiral  
60 line. I then place the plate in an etching-bath, and thus form a smooth spiral groove of appropriate depth in the material of the plate. As I have stated above, however, this  
65 groove might be formed in the etching-ground by any other type of engraving-machine, or it might be cut directly into the material of the plate by the action of the machine instead of first cutting it into the etching-ground and thereafter etching a groove upon  
70 the plate. From the zinc plate thus formed a mold or patrix is made, preferably after the fashion described in my Patent No. 548,623. The mold or patrix thus obtained  
75 is thereupon used to stamp a facsimile of the smooth-walled spiral groove of the zinc plate into the material of the ordinary gramophone record-plate as it exists before a sound-record has been impressed upon it—that is to say, the patrix is pressed against a flat plane-  
80 surfaced plate, usually of hard rubber.

By the means thus far described I produce, as will be seen, in any desired quantity hard-rubber record-plates of the kind now in use on gramophone-machines, but with a plain  
85 and smooth-walled spiral groove instead of a groove molded in accordance with sound-waves. Such a plate is shown in Fig. 1. It is obvious, of course, that these rubber plates with a smooth spiral groove could be made  
90 by cutting the groove directly into the material of the rubber plate by an engraving-machine instead of by the means above described. Such rubber or other record-plate with a preliminary spiral groove may now be  
95 sold to the users of gramophones or similar sound-reproducing apparatus.

As is well known, a gramophone is an apparatus which as ordinarily used translates a sound-record into sound; but it has here-  
100

tofore not been possible for these reproducing-machines to record sound with any degree of commercial success directly upon the hard material of which the record-tablets are composed. This was partially due to the fact that such reproducing-machines are built in a light and inexpensive way, so as to more especially adapt them for the primary purpose for which they have heretofore been intended. I have discovered, however, that when a record-tablet with a preliminary groove of the kind above described is employed such gramophone-machines, even as now built and sold, may be successfully used as recorders. To this end a record-tablet with a preliminary smooth-walled spiral groove is placed in the gramophone-machine, which is then set in motion while sounds are produced in the neighborhood of its diaphragm. The stylus of the gramophone now acts as a recording-stylus to shape, indent, or impress the laterally-undulating sound-records on the wall of the preliminary spiral groove. The approximate shape of the groove as it then appears after the sound-record has been impressed thereon is shown in Fig. 2, the walls of the preliminary groove being denoted by *a a* and the walls of the completed groove being designated *b b*. A close inspection of the finished record reveals both grooves.

The stylus which is used to make the sound-record in the preliminary groove is generally somewhat broader at the point than that which was used to form the groove in the first plate—that is to say, the point of the recording-stylus is somewhat wider than the preliminary groove. The preliminary groove seems to have the function of guiding the record-stylus and, what is more important, of lessening the work required to be done by the recording-stylus in shaping or indenting the material of the record-plate, which would otherwise have to be shaped or indented by the recording-stylus. This makes it possible to use for recording purposes the light and inexpensive gramophone reproducing-machine which is principally designed for reproducing purposes instead of being compelled to use the heavy and comparatively expensive recording-machine.

I have found the shape of the record-groove

as it finally appears in the record-tablet approximates the shape of such record-grooves as heretofore produced in accordance with the plans laid down in either of the patents above referred to, and, what seems to be quite remarkable, I have discovered that whatever difference in shape or configuration there may be between gramophone-records produced in the old way and produced in accordance with this invention such differences are not sufficient to prevent the reproduction of sound. The theoretical reasons for this I am not prepared to state. It is clear, however, from what has been said that such tablets with sound-records impressed upon a preliminary groove by a machine primarily designed for reproducing purposes may now be used for the reproduction of the sound recorded thereon by the same machine.

The method I have described for making sound-records might also be carried out by forming the preliminary spiral groove in the zinc plate as above described and thereupon superimposing a sound-record upon this preliminary groove in the zinc plate itself. A mold or patrix made from such zinc plate could then be used to impress facsimiles of sound-records of the character shown in Fig. 2 upon the usual rubber record-plates.

The sound-box A and stylus B, as well as the arm C, on which they are mounted, and which are shown in Fig. 3, are of the usual construction common in the art and need no detailed description.

What I claim is—

1. A sound-recording surface carrying a plain groove and a laterally-undulating sound-record groove superimposed thereon, substantially as described.

2. The method of preparing sound-records which consists in forming a groove upon a record medium, and shaping said groove laterally in accordance with sound-vibrations, substantially as described.

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

EMILE BERLINER.

Witnesses:

HELEN E. PARKER,  
HENRY S. BERLIN.

