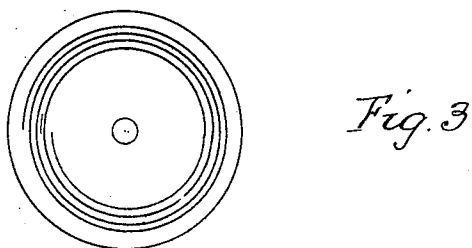
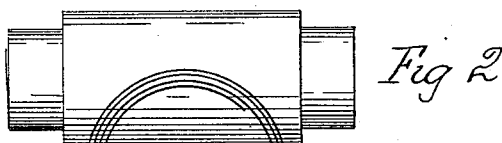
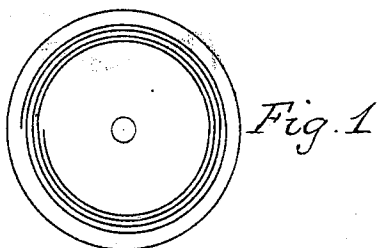


No. 773,532.

PATENTED OCT. 25, 1904.

T. A. & J. B. CONNOLLY.
METHOD OF MAKING SOUND RECORDS.
APPLICATION FILED DEC. 31, 1903.

NO MODEL.



Witnesses
R. H. Rowe
W. E. Wright

Inventors
Thomas A. Connolly
Joseph B. Connolly

UNITED STATES PATENT OFFICE.

THOMAS A. CONNOLLY AND JOSEPH B. CONNOLLY, OF WASHINGTON,
DISTRICT OF COLUMBIA.

METHOD OF MAKING SOUND-RECORDS.

SPECIFICATION forming part of Letters Patent No. 773,532, dated October 25, 1904.

Original application filed September 12, 1903, Serial No. 172,972. Divided and this application filed December 31, 1903. Serial No. 187,384. (No model.)

To all whom it may concern:

Be it known that we, THOMAS A. CONNOLLY and JOSEPH B. CONNOLLY, citizens of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Methods of Making Sound-Reproducing Records, of which the following is a specification, this application being a division of application Serial No. 172,972, filed September 12, 1903.

This invention has relation to records for sound-reproducing machines, and has for its object the production of a tablet-record having the sound-reproducing groove impressed, indented, or milled in its surface by means of a roller or mill having formed on its surface a sound-record in cameo or relief. In producing said milled record we proceed as follows: A master plate or die of hard metal is first formed by suitably etching a helical record traced through an etching-ground by means of a stylus of a sound-recording instrument. From said master plate or die a roller or mill is then produced by rolling a cylinder or segment of softer metal upon the master-plate under such pressure as will produce upon said roller or mill a counterpart in cameo or relief of the original record. This roller or mill is then hardened or tempered and rolled upon the surface of a plate of softer metal, so as to indent or mill the surface of the latter and produce a milled facsimile of the record of the master plate or die.

In the accompanying drawings, Figure 1 is a plan view of the etched master plate or die. Fig. 2 is a side view of the roller or mill, and Fig. 3 is a plan view of a milled sound-reproducing record.

In carrying our invention into effect we use as the preferable material for the master plate or die hardened steel, and the steel may be hardened or tempered either before or after the record has been etched thereon. The master-plate is prepared for etching by having its surface smoothly finished and, if desirable, polished or burnished and then thinly coated with a suitable etching-ground in which a helical record is traced by the stylus

of a sound-recording machine. The etching is then effected by means of a suitable etching fluid and the plate cleaned off. The etched record line or groove so produced will be of substantially even depth throughout, but laterally undulating. A cylinder of soft metal is then rolled on the etched plate under sufficiently heavy pressure in a suitable press to cause the surface of the roller to take up in relief or cameo a transfer of the record from the master-plate, and thus become a "mill." The roller or mill is then hardened or tempered and rolled over a metal plate under sufficient pressure in a suitable press to indent, impress, or mill on or into the surface of said plate an intaglio facsimile of the original etched record-groove. The plate so milled by the action of the cylindrical roller or mill, as above described, constitutes the sound-reproducing record for sound-reproducing machines and may be hardened or tempered to increase its durability and impart to it other desirable characteristics, and it may be plated or otherwise treated to prevent corrosion.

Instead of using steel for the master plate or die, the roller or mill, and the sound-reproducing plate or record the master-plate may be made of steel or other hard metal, the roller or mill of a softer metal than the master plate or die, such as copper or nickel, and the sound-reproducing record-tablet of a still softer material than the roller or mill, such as tin or aluminium or a suitable non-metallic material.

If necessary or desirable, the surface of the roller or mill may be buffed or polished after receiving the record in cameo or relief without impairing its accuracy.

A large number of sound-reproducing records may be produced from a single roller or mill, and many rollers or mills may be produced from a single master plate or die.

Records according to our invention can be produced with great facility and at comparatively low cost. When made of hardened steel, they cause less wearing friction on the stylus and walls of the groove than occurs with records made of other materials. The

record-grooves are more even and accurate than those formed in soft plastic material, and, owing to the unyielding character of the material, the tone qualities are more pronounced and true.

Having described our invention, we claim and desire to secure by Letters Patent—

1. The method of making sound-reproducing records, which consists in etching a record line or groove in a metallic plate, transferring said record to a roller in relief or cameo and thereby producing a mill, and then transferring the record from the mill to a second metallic plate.
2. The method of making sound-reproducing records, which consists in producing a master-plate, having a record-line in intaglio, transferring said record in cameo or relief to a roller or mill, and transferring the record in intaglio to a second plate from said roller or mill.
3. The method of making sound-reproducing records, which consists in producing a roller or mill having a record in relief or cameo, from a plate having a record in intaglio, and then reproducing the said intaglio-record in another plate by means of said roller or mill.
4. The method of making sound-reproducing records, which consists in taking a transfer from a record-plate, having a record-groove, to a soft-metal roller or mill, then

hardening said roller or mill, then transferring the record from the roller or mill to a second plate and hardening the last-named plate.

5. The method of making sound-reproducing records, which consists in producing a roller or mill having a sound-record in cameo or relief, from a grooved plate, then finishing or polishing the surface of said roller or mill and then transferring said record in intaglio to a second plate.

6. The method of making sound-records, which consists in producing a roller or mill having a volute record on its surface and transferring said record to a disk.

7. The method of making flat talking-machine records, consisting in rolling together a rotary negative volute record, and a material to receive impressions.

8. The method of making flat talking-machine records, consisting in rolling together a cylindrical negative volute record and a material to take impressions from the said negative record.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

THOMAS A. CONNOLLY.
JOSEPH B. CONNOLLY.

Witnesses:

W. E. WRIGHT,
R. W. ROME.