

Aug. 7, 1945.

R. K. POTTER
MAGNETIC SOUND RECORD
Filed Feb. 7, 1944

2,381,463

FIG. 1

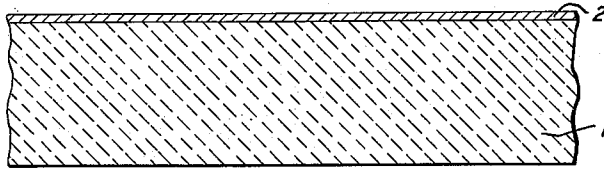


FIG. 2

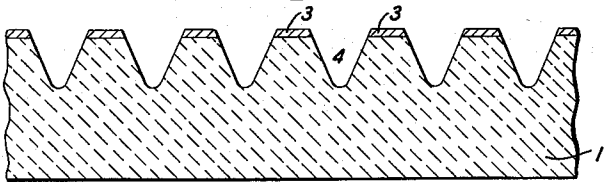


FIG. 3

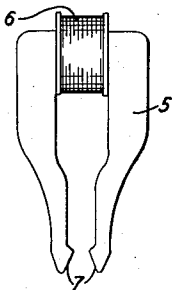


FIG. 4

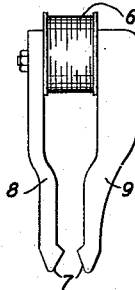
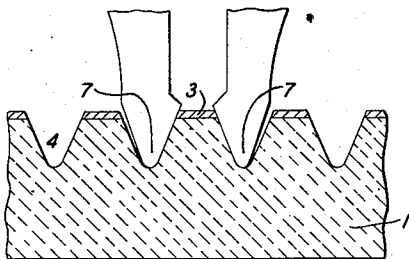


FIG. 5



INVENTOR
R. K. POTTER
BY W. L. Farnell
ATTORNEY

UNITED STATES PATENT OFFICE

2,381,463

MAGNETIC SOUND RECORD

Ralph K. Potter, Morristown, N. J., assignor to
Bell Telephone Laboratories, Incorporated, New
York, N. Y., a corporation of New York

Application February 7, 1944, Serial No. 521,322

1 Claim. (Cl. 179—100.2)

This invention relates to magnetic recording and the object of the invention is a magnetic record which may be recorded and reproduced without the use of any specialized driving mechanism.

Magnetic recording has a number of definite advantages over other known methods. Among these are the durability of the recording and the record material, the ability to reproduce immediately without processing and to erase a recording and rerecord repeatedly on the same material. These and other advantages make the magnetic method very attractive for many recording applications but the general use of this method has been restricted heretofore by the fact that magnetic recording materials in the usual form, such as wire or tape, require specialized driving mechanism which is expensive and not conveniently portable or generally available.

According to this invention a magnetic recording member is made up in disc or cylinder form similar in size to ordinary phonograph records of these types and provided with a plain spiral groove which is engaged by a phonograph stylus, or by the translating magnet itself, to move the translating magnet across the record member during both recording and reproducing operations. The groove shape and pitch is such as to leave a flat portion or "land" between adjacent turns of the spiral, this land being of uniform width throughout and constituting the recording portion of the record.

The records may be made in any of a number of ways depending on the characteristics of the particular recording material used and other factors such as the standard of quality desired in the particular case and the type of service for which the record is to be used.

These and other features of the invention will be clearly understood from the following detailed description and the accompanying drawing in which:

Figs. 1 and 2 show portions of a record according to the invention;

Figs. 3 and 4 are forms of translating magnets suitable for use with such records; and

Fig. 5 shows a magnet with pole tips contoured to fit into and follow the spiral groove.

In Fig. 2 the body 1 of the record may be made of any of a wide variety of materials such as any suitable plastic or ceramic, non-magnetic metals such as brass or as explained below even a magnetic material of low retentivity such as iron. The layer of magnetic material 2 on the lands 3 between the turns of the groove 4 may be any

suitable magnetic recording material deposited on or otherwise bonded to the body of the record.

According to one method of manufacture the recording material is first applied in a thin layer over the whole surface of the body of record as shown in Fig. 1 and the spiral groove is then cut, ground or etched into the body material through the surface layer to leave a spiral of the retentive material on the lands.

In cases where this general method is unsatisfactory, as for example when the magnetic material chosen has physical properties which make it very difficult to work, the groove may be cut in the body material and the recording material then applied only to the lands. When for example the body material is metallic, the groove may be filled with non-conductive material such as an enamel and the recording material deposited on the lands. If, on the other hand, the body or base material is non-metallic, it first may be covered with an easily workable film of bonding material such as a fluid cement, and the grooves cut into the base through the film of the bond material. The magnetic material in the form of either powder or thin sheets would be fused to the bond material remaining on the lands. In either case the groove would then be cleaned in any suitable manner to put the record in condition for use.

The translating magnet for such a record may take the general form of Fig. 3 in which a single-piece, rigid yoke 5 carries a signal coil 6 and is provided with pole tips 7, 7 suitably spaced and shaped, as shown more clearly in Fig. 5, to track in two adjacent grooves in contact, or very nearly in contact, with opposite sides of the magnetic material on the intermediate land. Alternatively, as shown in Fig. 4, the yoke may be made up of two parts 8 and 9 secured together, at least one of which such as 8, having some resilience so that the pole tips will readily adjust themselves to the exact spacing required for smooth tracking in the grooves.

By means of a suitable adjustable clamping device magnets of these types may be readily attached to the reproducer arm, or to the reproducer itself, of an ordinary phonograph which may then be used in the usual manner to record or reproduce the records of this invention. With the magnet structures shown, the spiral strip of recording material will be magnetized transversely but the record may be used quite readily for recording in various other ways. For example, magnet structures similar to those shown can be rotated through 90 degrees and operated in sliding contact with the surface of the magnetic material

for recording longitudinally in the well-known manner or the recording may be made on the "perpendicular" sense by using a single pole-piece in contact with the surface of the material. In these cases the magnets may be so mounted on the reproducer that the reproducer stylus engages the groove to serve as the magnet feeding mechanism or the magnets may be fitted with a groove contacting device for this purpose. When the recording is perpendicular it may be desirable to concentrate the flux by using for the body 1 a magnetic material of low retentivity such as soft iron as explained in detail in Patent 2,185,300 to C. N. Hickman.

It is therefore apparent that records shown may vary widely in their detail construction and may be used to record in accordance with various known methods but in all cases the records are of a type which can be used quite readily wherever an ordinary phonograph is available. Moreover, due to the fact that the translating magnets are positively driven by the same groove during both

the recording and reproducing operations accurate tracking is assured and, if desired, any portion of the record can be readily marked for easy identification by means of any of the well-known indexing means.

While several alternate methods of manufacture have been described by way of illustration, it will be understood that the invention is intended to be limited only by the scope of the following claim.

What is claimed is:

The method of making a magnetic sound record which comprises forming a spiral groove in a record base member with lands between the turns of the groove, filling the groove with a readily removable substance, applying magnetic recording material to the surface of the member containing the groove and finally cleaning out the groove to leave recording material on only the lands of the base member.

RALPH K. POTTER.