

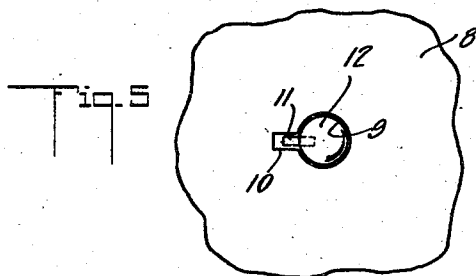
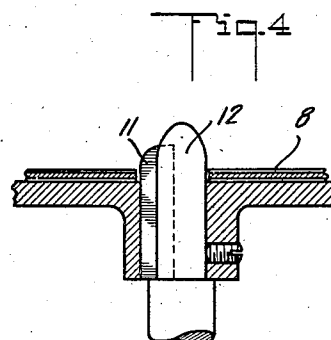
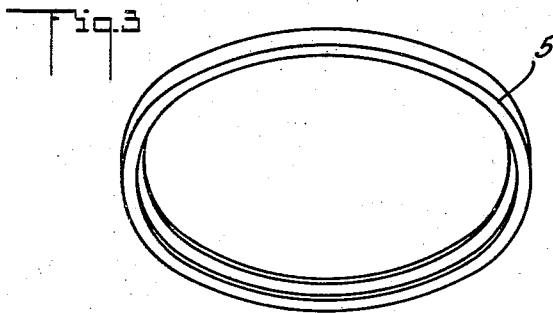
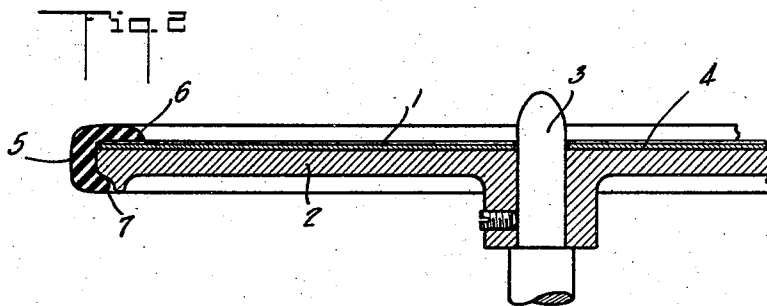
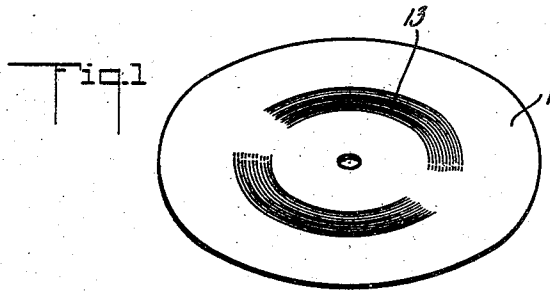
Feb. 9, 1943.

F. RIEBER

2,310,545

SOUND RECORD CARRIER

Filed Sept. 19, 1939



INVENTOR
Frank Rieber
BY *John Flann*
ATTORNEY

UNITED STATES PATENT OFFICE

2,310,545

SOUND RECORD CARRIER

Frank Rieber, Los Angeles, Calif., assignor to
Memovox, Incorporated, Cleveland, Ohio, a cor-
poration of Ohio

Application September 19, 1939, Serial No. 295,612

2 Claims. (Cl. 274—39)

This invention relates to sound records, and especially to the blanks upon which such records may be carried, and particularly upon which the records may be formed by an embossing process.

It has been common in the past to employ a recording stylus mechanically cutting a groove on a blank in the form of a disk, the stylus point being vibrated in accordance with the impulses or sounds to be recorded. While the record blanks in the past have been quite satisfactory for use in connection with cutting styli, they are not suitable for use with embossing styli. It is one of the objects of this invention to adapt the embossing process to records of this character, and to obtain embossed records of high quality.

It is another object of this invention to improve in general the quality and fidelity of such sound records.

It is another object of this invention to make it possible effectively to utilize a very thin, flexible record, whereby little space is required for storage; and the danger of accidental breaking is obviated.

It is still another object of this invention to provide a record blank made from a material such that renders it possible to record with fidelity, the frequencies encountered in the higher register of audibility and particularly by an embossing process.

This invention possesses many other advantages and has other objects which may be made more easily apparent from a consideration of several embodiments of the invention. For this purpose there are shown a few forms in the drawing accompanying and forming part of the present specification. These forms will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Referring to the drawing:

Figure 1 is a pictorial view of a sound record carrier embodying the invention;

Fig. 2 is a fragmentary sectional view, illustrating the manner in which the sound record carrier may be supported upon a phonograph turntable.

Fig. 3 is a pictorial view of the clamping element illustrated in Fig. 2;

Fig. 4 is a fragmentary sectional view, showing a modified form of the invention; and

Fig. 5 is a fragmentary top plan view of the modification illustrated in Fig. 4.

The sound record carrier, which is in the form of a thin disk, is preferably made from an appropriate plastic compound. The disk is made sufficiently thin as to be very readily flexible. For example, there have been successfully used disks of the thickness of .006 inch for a disk having a diameter of eight inches. For larger disks, thicker materials may be used, such as .010 inch for disks having a diameter of fourteen inches; and from .013 to .015 inch for disks having a diameter of sixteen inches.

In most of these instances, both sides of the disk may be utilized for recording purposes.

By making definite provisions, it is possible accurately to record sound waves in the higher register in an effective manner. One of the factors for this is the material chosen for the disk. This material is preferably an ethyl cellulose. It has the property of yielding abruptly beyond a definite pressure level, so that the embossing process of recording may readily be used. It is also free from granular impurities, which impurities may cause irregular recording and reproducing effects. Furthermore, the record carrying surface of the disk is treated with a very thin film of lubricant such as carnauba wax, or any other lubricant capable of adhering very closely to the disk surface. Such lubricant may be applied, as by first dissolving the lubricant in a solvent, and by spraying it or otherwise spreading it on the disk surface. It may then be polished.

The extremely smooth record surface thus obtained, in conjunction with an extremely smooth jewel recording stylus, such as a sapphire, makes it possible to apply the recording stylus at a steeper angle to the surface of the disk, without danger of irregular recording action. Therefore, since the disk area contacted by the stylus is less than if the angle were not so steep, the stylus can more effectively impress or emboss the disk with forces corresponding truly to these higher frequencies.

The material of the disk can be made light in color as by including titanium oxide, finely ground, in the plastic material from which the disk is made. The light color makes it possible to detect foreign matter such as dust or the like, and facilitates cleaning of the record. Furthermore, it is possible to mark the record readily with any marking utensil, such as graphite or wax pencil, for noting the ending or beginning of paragraphs, letters or corrections, or the like.

Because the disk is of very thin material, it must be placed upon a smooth flat surface, so

as to ensure that the embossing forces will be fully effective upon the disk. For this purpose the rotating phonograph table 2, shown as mounted on a spindle 3, has a smooth upper surface 4. Upon this upper surface the disk 1 is placed. In the usual thick disk records it has been common to drive the disk by the aid of friction between the disk and the table. In the present instance this, of course, is impossible because of the necessity of providing a smooth supporting surface. Therefore some positive means for driving it is provided for.

For example, it is possible to clamp the outer edge of the disk 1 to the table, as by a resilient rubber rim 5. This rubber rim 5, acting as a resilient band, has an overlying flange 6 adapted to contact the outer edge of the disk 1. It also tightly embraces the vertical edge of the table 2, and may if desired be provided with an inwardly directed bead 7, projecting underneath the vertical edge of the table 2. Of course, there are other ways in which this drive can be effected. For example, in the form illustrated in Figs. 4 and 5, the disk 8 is shown as having a central aperture 9 with a key-hole slot 10, through which a driving key 11 carried by the spindle 12 may be accommodated.

The recording is preferably accomplished at a constant linear rate, approximating six inches per second. The recording grooves may begin from an inner portion of the disk 1 such as illustrated for example by the inner portion of the disk 1 such as illustrated for example by the inner line 13 of Fig. 1, and can progress radially outwardly. The pitch between the spiral turns may be of the order of 150 per inch.

Since the recording or reproducing is accomplished by outward radial movement, the tendency of this radial movement is to apply a smoothing force upon the disk 1. This force is

not materially obstructed by the flange 6, under which the outer edge of the disk 1 may readily creep. As soon as this smoothing force is applied in an outward direction, the record disk 1 stays flat, and the tendency for the disk to deform is reduced.

The actual depth of the groove produced by the embossing process is preferably such that it occupies as much depth as the ungrooved remainder. In other words, a disk carrying a record on but one side of the record disk is .006 inch thick, then the recording groove is preferably .003 inch thick, the ungrooved portion being the same. With a double faced disk record having an over-all thickness of .013 inch, the depth of the record groove on each side may be of the order of .004 inch, leaving an ungrooved central portion of about the same depth.

What is claimed is:

1. A thin flat, phonographic record, a rotary table having a smooth surface upon which said record rests, and means preventing relative angular movement between the table and the record, comprising a resilient rim member embracing the outer edge of the record and of the table.

2. A thin flat, phonographic record in the form of a disk, and adapted to carry a record groove progressing toward the outer edge of the disk, a rotary table upon which said disk is supported, and means coupling said table and disk in such manner as to obviate relative angular movement between them, while permitting said disk to be flattened over the table surface in response to a force acting outwardly, radially from the center, comprising a resilient rim member overlapping the edges of the table and the disk.

FRANK RIEBER.