

P. J. PACKMAN.
SOUND REPRODUCING MACHINE.
APPLICATION FILED OCT. 14, 1910.

1,250,637.

Patented Dec. 18, 1917.

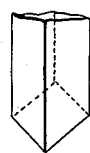
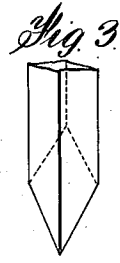
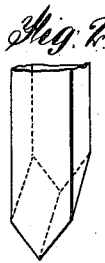
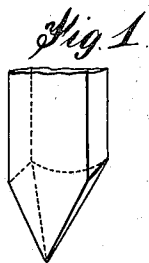


Fig. 4.

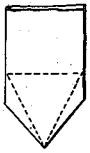


Fig. 5.

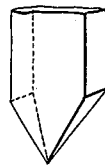


Fig. 6.

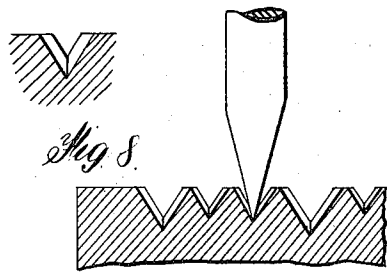
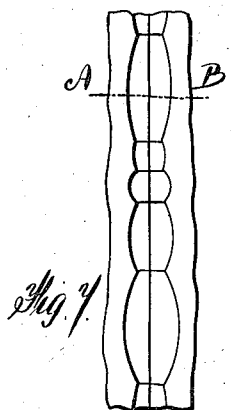


Fig. 9.

Witnesses:-

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UNITED STATES PATENT OFFICE.

PERCIVAL JAMES PACKMAN, OF HIGHBURY, LONDON, ENGLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE AEOLIAN COMPANY, OF MERIDEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

SOUND-REPRODUCING MACHINE.

1,250,637.

Specification of Letters Patent.

Patented Dec. 18, 1917.

Application filed October 14, 1910. Serial No. 586,985.

To all whom it may concern:

Be it known that I, PERCIVAL JAMES PACKMAN, a subject of the King of Great Britain and Ireland, residing at 66 Hamilton road, Highbury, in the county of London, England, have invented certain new and useful Improvements Relating to Sound-Reproducing Machines, of which the following is a specification.

This invention relates to sound reproducing machines in which "hill and dale" cut records are employed and has for its object to increase the capacity of a record without substantially diminishing the volume of sound.

It has been usual to cut a record of the "hill and dale" type with the groove in the form of a U in cross section which has necessitated the use of a reproducing stylus terminating in a small ball.

Owing to the U form of the groove, it is not possible to obtain a very long record on the usual size of blank, as the convolutions of the spiral cannot be brought very close together and be cut to the required depth to give a good volume of sound owing to the risk of the convolutions overlapping one another to some extent.

According to the invention I cut a "hill and dale" groove of substantially a V shape in section and I employ a very fine or needle pointed stylus for the reproduction by contact of its extremity with the bottom of the V shaped groove. It will be understood that contrary to what is the case with a record formed by a U-shaped cutting instrument, there is a definite and distinct line of track, that is, the bottom of the groove cut by the point of the instrument, which always coincides with the true convolutions of the spiral or helix, and against which the point of the stylus fundamentally bears, as clearly seen from the drawing.

It will thus be understood that by securing frictional or bearing contact of the stylus with the bottom of the groove only, *i. e.*, the line of track a substantial clearance space will be left on either side, that is to say the angle between the sides of the groove will be greater than the angle of taper of the fine or needle pointed end of the reproducing stylus itself.

In the drawings, Figure 1 shows diagrammatically on a much enlarged scale by way

of example a cutter of sapphire or other suitable substance for cutting the V on the record. The angle between the cutting edges is acute, and the cutting faces or edges are ground so as to leave a sharp point which will actually yield a very narrow space at the bottom of the groove against which the extremity of the fine or needle pointed reproducing stylus may contact.

The stylus used in carrying out this invention has a hard, fine or needle point, and is preferably made of the highest grade hardened tool steel.

Figs. 2 to 6 show modified forms of tools adapted to be employed for cutting the V-shaped groove in a record. The tools are drawn to a large scale for the sake of clearness.

Fig. 7 shows a greatly enlarged plan view of a small portion of a track made according to this invention, showing the distinct line of track produced by the cutting of the groove and

Fig. 8 shows a cross section of the same on the line A—B of Fig. 7.

Fig. 9 shows diagrammatically to an enlarged scale a reproducing stylus in position with its fine or needle point in the bottom of the V shaped groove of a record.

The stem of the stylus is provided of ample thickness with its extremity only reduced to a fine point so that it may fundamentally bear on the line of track at the bottom of the groove formed by the use of a cutting tool such as illustrated in Figs. 1 to 6.

By such means it is possible to secure reproduction of a hill and dale V cut record without involving any substantial diminution in the volume of the sound, while, furthermore, it is possible to cut a relatively great number of threads per inch and thus to increase the capacity of the record while maintaining fullness and purity of tone without echo. It will thus be understood that the grooves cut will have a minute width and therefore also a minute depth, and that by reason of the recording tool acting as a cutter the walls of the groove will be sharply and cleanly cut and by reason of the cutter having a sharp point a smooth and continuous line will be cut at the bottom of the groove.

The stylus is conveniently mounted in a holder so that its movement due to the ver-

tical undulations of the line of track are directly communicated to the diaphragm in the usual manner.

What I claim as my invention and desire
5 to secure by Letters Patent is:—

In a sound-reproducing machine, the combination of a "hill and dale" record having a groove of V-shaped section with a definite line of track at the bottom; and a stylus hav-

ing a needle point of narrower V-shaped section bearing fundamentally on said line of track. 10

In testimony whereof, I affix my signature, in presence of two witnesses.

PERCIVAL JAMES PACKMAN.

Witnesses:

A. BROWNE,
L. SIMMONDS.