No. 728,382. PATENTED MAY 19, 1903.

J. C. ENGLISH.

DIAPHRAGM FOR MACHINES FOR RECORDING OR REPRODUCING SOUND OR SPEECH.

APPLICATION FILED MAY 23, 1899.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1,

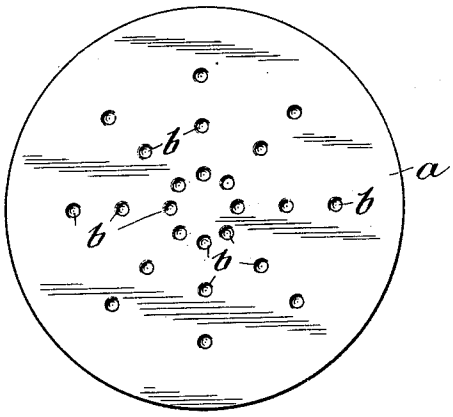


Fig. 2,

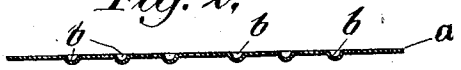


Fig. 3,

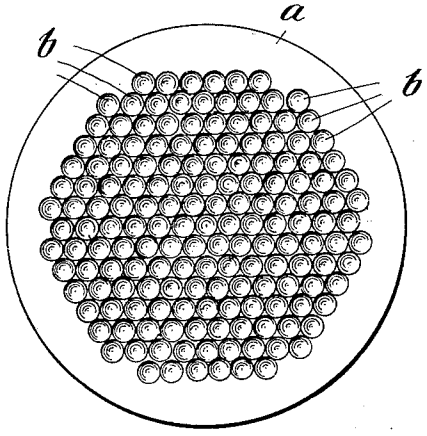


Fig. 4,



WITNESSES:

D. N. Naylor

Edwin Seger

INVENTOR

John C. English

BY

Kenyon & Kenyon

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 728,382. PATENTED MAY 19, 1903.

J. C. ENGLISH.

DIAPHRAGM FOR MACHINES FOR RECORDING OR REPRODUCING SOUND OR SPEECH.

APPLICATION FILED MAY 23, 1899.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 5,

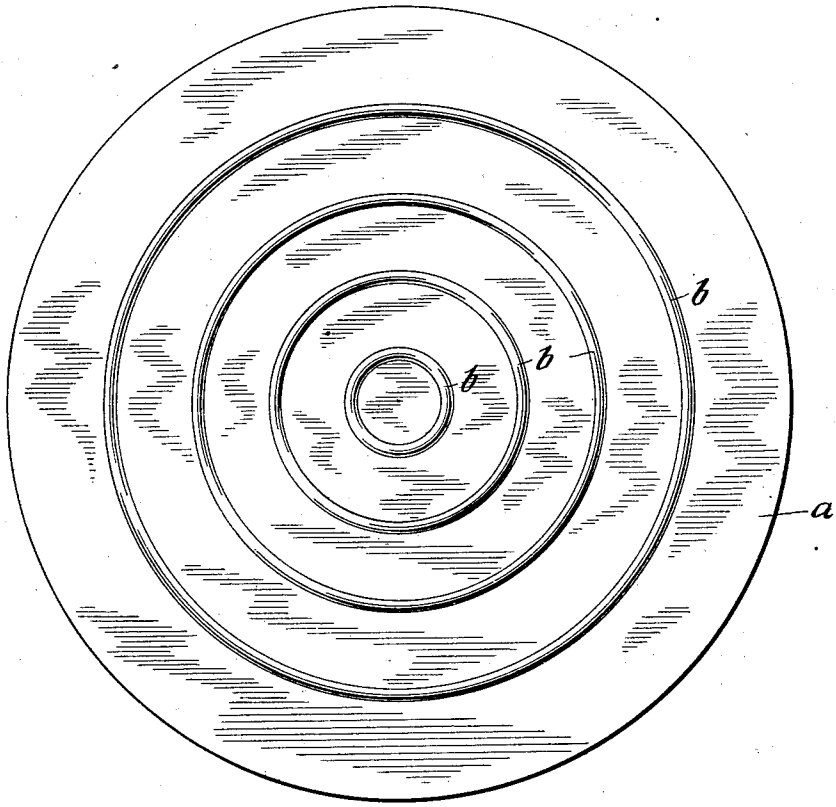


Fig. 6,



WITNESSES:

D. N. Hayward

Edwin Seger.

INVENTOR

John C. English

BY

Kenyon & Kenyon,

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 728,382. Patented May 19, 1903.

UNITED STATES PATENT OFFICE.

JOHN C. ENGLISH, OF NEW YORK, N. Y.

DIAPHRAGM FOR MACHINES FOR RECORDING OR REPRODUCING SOUND OR SPEECH.

SPECIFICATION forming part of Letters Patent No. 728,382, dated May 19, 1903.

Application filed May 23, 1899. Serial No. 717,890. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. ENGLISH, a citizen of the United States, and a resident of New York, in the county and State of New York, have invented an Improvement in Diaphragms for Machines for Recording or Reproducing Sound or Speech, of which the following is a specification.

My invention relates to diaphragms for use in machines for recording or reproducing sound or speech. Its object is to provide a diaphragm which will more accurately and faithfully transmit vibrations of sound or speech to be recorded by a recording-style upon a recording-surface or vibrations produced by a reproducing-style from a recording-surface to reproduce sound or speech; also, to improve the quality, tone, and quantity of sound or speech thus reproduced from a recording-surface.

It consists of the novel devices herein shown, described, and claimed.

In the drawings accompanying this specification and forming part hereof, and in which similar letters in the different figures represent corresponding parts, I have shown and will now proceed to describe the preferred embodiments of my invention.

Figure 1 is a face view of a diaphragm embodying my invention. Fig. 2 is a cross-section therethrough. Fig. 3 is a face view of another form of diaphragm embodying my invention. Fig. 4 is a cross-section therethrough. Fig. 5 is a front view of a diaphragm, showing the preferred embodiment of my invention, and Fig. 6 is a cross-section therethrough.

My improved diaphragm consists of a metallic disk of any suitable size and made of any suitable metal, preferably of steel having a flat operative surface, and having one or both of its surfaces distorted. This distortion I preferably produce by providing the diaphragm with indentations. These indentations are shallow and are preferably concentrically arranged, and the number of indentations is preferably greater toward the center of the disk than toward its circumference relatively to the surface of the diaphragm occupied by such indentations.

a is the disk of the diaphragm.

b represents the distortions, here shown as indentations. The indentations may be made in any manner and may be of any suitable size or shape and may be arranged upon the surface of the diaphragm in any suitable way. While the distortions may be irregular in shape or size or arrangement, I prefer to make them of the same shape and size and to arrange them in some orderly or geometrical manner. Thus in Figs. 1, 2, 3, and 4 the indentations are all alike and each forms a cup-like depression upon one side of the diaphragm and a raised projection upon the other, while in Figs. 5 and 6 the indentations are shown in the form of grooves upon one side of the diaphragm and ridges upon the other. In Fig. 1 the indentations are shown as separated from one another and as arranged in concentric rings. In Fig. 3 they are shown as massed together.

I find that the best effects are produced when the number of distortions are relatively greater for the surface of the disk toward the center of the disk than toward the circumference. I prefer also in practice to use the indentations in the forms shown in Figs. 5 and 6, where the indentations are in the shape of continuous concentric indentations or, in other words, in the shape of grooves or ridges, or both.

I am aware that attempts have been made to use diaphragms whose operative surface was composed wholly of waves or undulations. In such diaphragms the operative surface is not a flat surface or a disk-like surface at all. Upon both sides the surface of the diaphragm goes in and out, rendering the diaphragm very yielding and mobile, particularly at its center, and tending to increase the amplitude of the movements and to diminish the quickness of the same. This is exactly the reverse effect from that produced by my improvement. In my improved device the flat disk-like operative surface is maintained, and the shallow distortions or indentations in the surface tend to strengthen and stiffen the diaphragm and to make it more elastic in the true sense of that term and respond more quickly to the vibrations, especially at the center of the diaphragm, where strength, stiffness, and elasticity are most needed, instead of tending to make the diaphragm more yielding, mobile, and inelastic. I have found that

a flat disk-like surface when thus strengthened transmits vibrations more crisply and sharply and more accurately and faithfully than when such a disk is without distortions or indentations and more crisply, sharply, accurately, and faithfully than does a yielding, mobile, and inelastic diaphragm whose whole surface is not flat or disk-like, but is on both sides thrown into waves or undulations.

What I claim as new, and desire to secure by Letters Patent, is—

1. A diaphragm for a machine for recording or reproducing sound or speech, consisting of a metallic disk having a flat operative surface provided with shallow distortions concentrically arranged, the distortions being closer together near the center of the disk.

2. A diaphragm for a machine for recording or reproducing sound or speech consisting of a metallic disk having a flat operative surface provided with concentric rings of shallow indentations, substantially as set forth.

3. A diaphragm for a machine for recording or reproducing sound or speech consisting of a metallic disk having a flat operative surface provided with concentric rings of shallow indentations, the rings being closer together near the center of the disk, substantially as set forth.

4. A diaphragm for a machine for recording or reproducing sound or speech consisting of a metallic disk having a flat operative surface provided with continuous concentric shallow indentations, the indentations being closer together near the center of the disk, substantially as set forth.

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

JOHN C. ENGLISH.

Witnesses:
EDWIN SEGER,
GEO. W. MILLS, Jr.