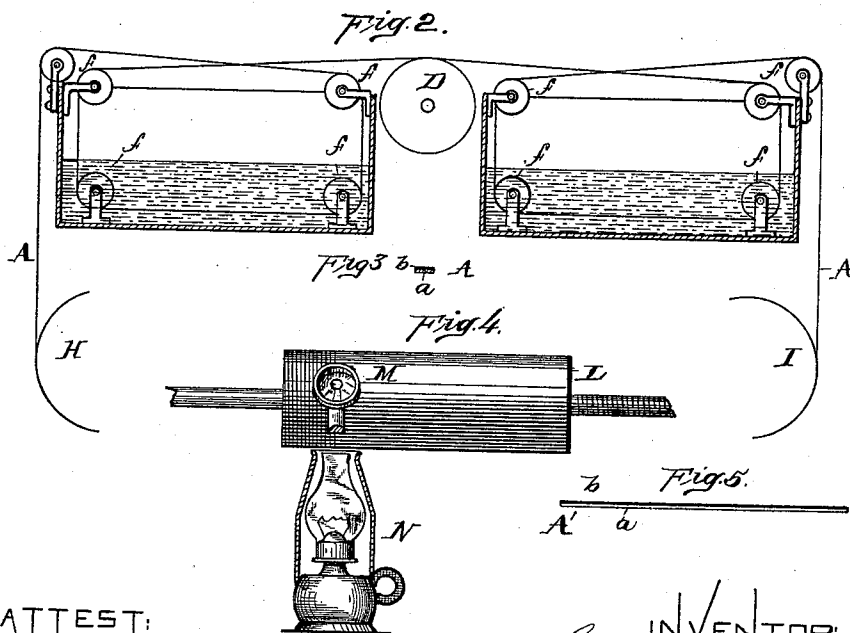
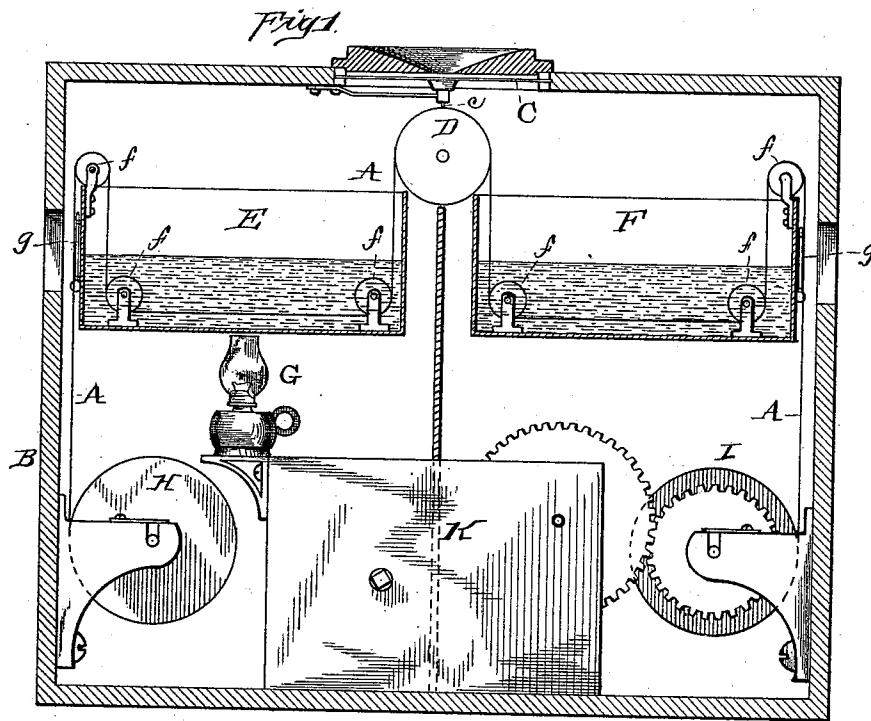


(No Model.)

G. H. HERRINGTON.
METHOD OF RECORDING SPEECH.

No. 392,953.

Patented Nov. 13, 1888.



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UNITED STATES PATENT OFFICE.

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METHOD OF RECORDING SPEECH.

SPECIFICATION forming part of Letters Patent No. 392,953, dated November 13, 1888

Application filed September 11, 1886. Serial No. 213,278. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. HERRINGTON, of New York city, in the county and State of New York, but formerly of Wichita, in the State of Kansas, have invented a certain new and useful Improvement in Phonographs, of which the following is a specification.

Heretofore the great obstacle in the way of the development of the phonograph has been the fact that the mediums used for receiving the indentations or impressions of the diaphragm-needle were necessarily somewhat rigid, in order to preserve the form of such indentations and enable the sound-waves to be reproduced therefrom. This characteristic of the recording medium reduced largely the sensitiveness of the phonograph-diaphragm and made the record incomplete. At the same time the necessity for using a recording medium sufficiently yielding to be to some extent indented by the diaphragm-needle has resulted in the production of records having no degree of permanency and not capable of removal from the machine and transportation to distant points for reproducing the sound-waves when placed upon other machines. It will be seen, then, that a successful recording medium must possess the qualities of minimum softness when passing under the point of the diaphragm-needle in producing the record and of the maximum hardness after the indentations are formed; and it is the object of my invention to produce a method of operation which will accomplish this end.

In carrying my invention into effect I employ as a recording medium to receive the needle-indentations a material capable of being softened or made plastic and of afterward becoming hardened. I cause such surface to receive the indentations while in its softened or plastic condition, and it retains them when it becomes hard again. I prefer to employ a substance such as boiled tar, pitch, resin, asphalt, dental wax, or similar hard substances or compounds, which become plastic when heated, and by the employment of heat I soften to the desired degree this surface as it passes under the point of the diaphragm-needle, and then, by cooling, harden the surface to give the record permanency.

The heat-affected medium is preferably ap-

plied as a coating to a suitable supporting thread, strip, or sheet of metal, fabric, paper, or rubber, and this supporting-body is also preferably flexible, so as to be readily wound upon spools and passed around wheels or drums. The recording-surface may also be covered with an extremely thin metallic foil, or be powdered, to prevent sticking to the needle or to the wheels or rollers while in a plastic condition.

The heat may be applied in any suitable way, and air, water, or steam may be used, the recording medium passing through a heating-chamber, or over or around heating drums or rolls just before reaching the diaphragm-needle. The cooling may be effected by an air or water chamber, or by drums, or by other suitable means.

The phonograph may have a motor to move the recording medium under the point of the diaphragm-needle, and the same machine may, by the removal of the heating and cooling devices, be used to reproduce sound from such a record as has been described.

The same method and essentially the same apparatus can be employed for recording the movements of telephonic or telegraphic apparatus, so as to register messages sent by such instruments, without departing from the spirit of my invention.

In the accompanying drawings, forming a part hereof, Figure 1 is a vertical section of a simple form of apparatus illustrating the invention; Fig. 2, a similar view of some of the principal parts of a modified form of apparatus; Fig. 3, a cross-section of the recording-strip used with the apparatus of Figs. 1 and 2; Fig. 4, a side elevation and partial section illustrating the application of the invention to the ordinary form of phonograph, and Fig. 5 an edge view of a recording-sheet such as would be used with the apparatus of Fig. 4.

The recording-strip A or sheet A' has a flexible body, *a*, of thin metal, fabric, paper, rubber, or other suitable material, provided with a surface, *b*, of the recording medium—such as boiled tar, pitch, resin, asphalt, hard dental wax, or other similar substance or compound—and this surface may or may not be powdered or covered with extremely thin metallic foil, as before set forth.

In the apparatus shown in Figs. 1 and 2, a suitable box or frame, B, is provided for supporting and inclosing the parts. The ordinary phonograph-diaphragm C is supported in an opening in the top of this box, and beneath the diaphragm is the needle *c*, mounted in the ordinary way. Directly below the needle *c* is the roller D, over which the recording-strip A passes in a suitable guiding-groove, this roller serving to bring the recording-strip into contact with the point of the diaphragm-needle.

Heating and cooling chambers E and F are supported in the box B on opposite sides of the roller D, and are provided with wheels or rollers *f* for guiding and directing the recording-strip. A lamp, G, is shown for heating the chamber E, and the recording-strip passing through it. Thermometers *g* are shown, by which the temperature of the chambers E and F can be seen and regulated. Rollers H and I carry the recording-strip, and a motor, K, gives the necessary movement to the strip.

In Fig. 2 the wheels or rollers *f* of the heating and cooling chambers are arranged so that in passing around them the recording-surface of the strip will not touch these wheels or rollers.

In Fig. 4 an ordinary phonograph-cylinder, L, is shown, upon which the sheet A' is placed. The phonograph mouth-piece is shown at M. A lamp, N, is shown for heating the recording-surface of the sheet to a plastic condition as it passes under the diaphragm-needle. The recording-surface is cooled by the air as it passes from the influence of the lamp.

It is evident that the method which constitutes my invention may be employed in many forms of apparatus. The recording medium is made as plastic as possible without injury as it passes under the diaphragm-needle, thus giving the greatest possible freedom of movement to the diaphragm, while the subsequent cooling by the atmosphere or artificially gives the recording medium a permanent hardness. When a message or communication has once

been registered on the strip or sheet by a phonograph, telephone, or telegraph-instrument, it can be repeated any number of times, and can be handled without injury to the impressions and sent to any distant point to be repeated without the aid of a skillful operator at that point.

By removing the lamp or other heating medium the same apparatus may be employed to reproduce the sounds by running the strip or sheet under the diaphragm-needle, so that its point will follow the sound-wave impressions or indentations.

It will be understood that I do not limit myself to the use of any particular material or compound as a recording medium, as any material or compound may be employed which, when heated, is sufficiently yielding or plastic to readily receive impressions, and which will set and retain the impressions when cold.

I do not claim herein the apparatus before described for carrying my invention into effect, since I am required by the Commissioner of Patents to embody this in a separate application.

What I claim is—

1. The method of recording sounds or messages for reproduction, consisting in reducing the recording medium to a yielding or plastic condition, passing it through the recording-instrument while in such plastic condition, and then allowing it to harden to set the impressions, substantially as set forth.

2. The method of recording sounds or messages for reproduction, consisting in heating the recording medium to a yielding or plastic condition, passing it through the recording-instrument while in such plastic condition, and then cooling it to set the impressions, substantially as set forth.

This specification signed and witnessed this 10th day of September, 1886.

GEO. H. HERRINGTON.

Witnesses:

WM. PELZER,
E. C. ROWLAND.