

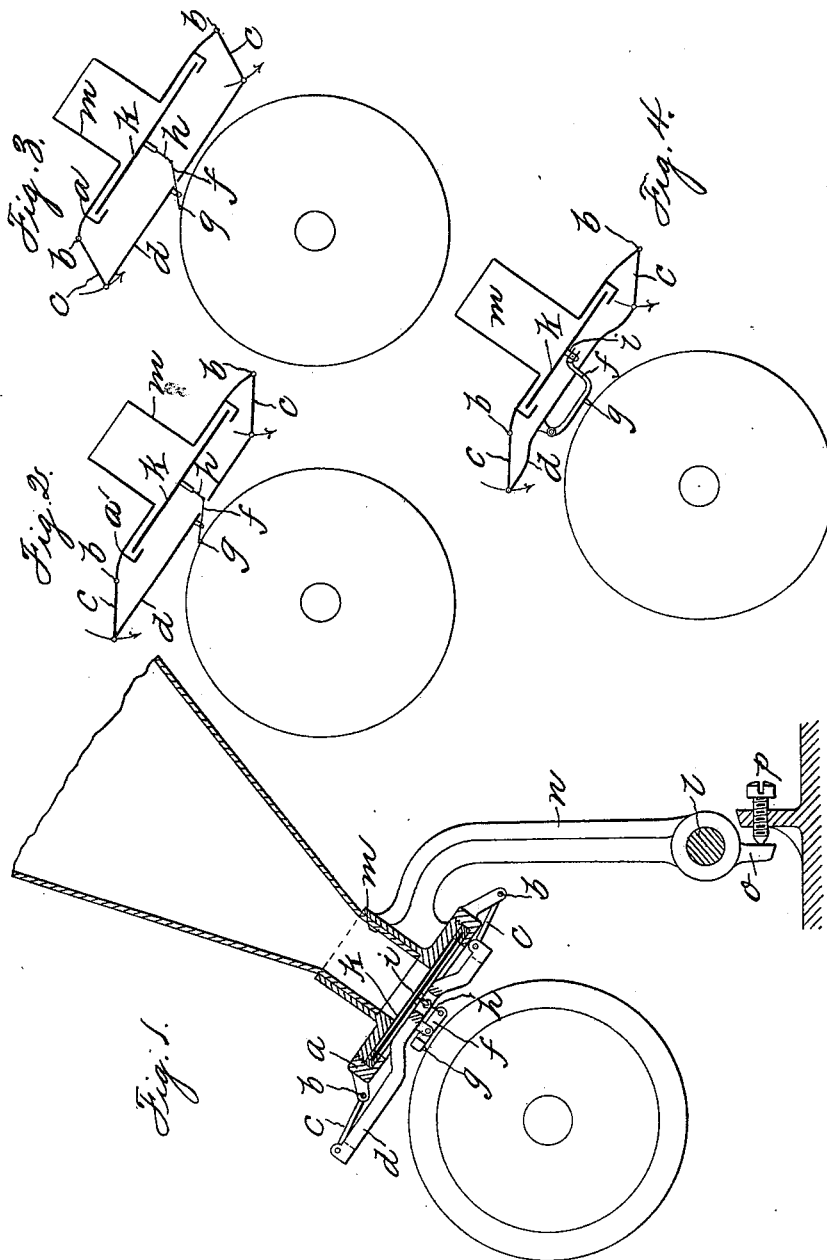
No. 646,014.

P. VON WOUWERMANS.  
PHONOGRAPH.

Patented Mar. 27, 1900.

(Application filed Sept. 25, 1897.)

(No Model.)



Witnesses:  
A. Ober.  
B. Sommers.

Inventor,  
Philipp von Houwermans  
by *[Signature]*  
Attorney

# UNITED STATES PATENT OFFICE.

PHILIPP VON WOUWERMANS, OF VIENNA, AUSTRIA-HUNGARY, ASSIGNOR  
OF NINETEEN TWENTY-FIFTHS TO THEODOR FISCHER, MAX RAPHAEL  
KALDEGG, AND IGNAZ PULAY, OF SAME PLACE.

## PHONOGRAPH.

SPECIFICATION forming part of Letters Patent No. 646,014, dated March 27, 1900.

Application filed September 25, 1897. Serial No. 653,023. (No model.)

*To all whom it may concern:*

Be it known that I, PHILIPP VON WOUWERMANS, a subject of the Emperor of Austria-Hungary, residing at Vienna, in the Province of Lower Austria, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Tension Devices for Phonograph-Diaphragms, (for which Letters Patent have been obtained in Austria, dated 10 July 9, 1897, registered Vol. 47, folio 2650;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the 15 same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The experience heretofore obtained with 20 phonographs has shown that the tension of the diaphragm—that is to say, the pressure with which the recording-knife cuts into the wax roller—must in the case of spoken language be different to that for recording singing, whistling, and music; also, that when re- 25 producing from a record by means of the reproducing-pin shrill tones, both spoken and musical, are capable of being rendered clearer or softer by producing a greater tension of 30 the diaphragm.

Now the apparatus which forms the subject of the present invention and which is designed to effect in a perfect manner this twofold object produces a continual intimate contact 35 of the recording-pin or of the reproducing-pin with the roller and also imparts to the diaphragm a certain tension which can be adjusted to suit requirement. This apparatus is characterized by the fact that the pivot of 40 the lever which connects the diaphragm with the recording-pin or with the reproducing-pin is loaded by a weight which is rendered capable of movement by means of a parallel motion, so that when the body of the diaphragm 45 is adjusted relatively to the roller by means of regulating device the pressure of the pin upon the roller—that is to say, the tension of the diaphragm—will be varied.

Figure 1 of the accompanying illustrative

drawings shows, partly in vertical section and 50 partly in elevation, one construction of tension apparatus according to this invention. Figs. 2 and 3 show the loading device in two other different positions, and Fig. 4 illustrates the same in combination with another arrange- 55 ment of lever for the recording-pin or the reproducing-pin.

In the device for holding the diaphragm—such, for example, as the clamping-ring *a*—there are arranged parallel to the roller-axis 60 and opposite to each other two pivots *b*, upon which are mounted so as to be capable of turning thereon two radius or guide links *c*, which are connected together by a cross-piece *d* of determined weight and of a length exactly 65 equal to the distance between the pivots. This cross-piece, which is suspended from the radius-links and which, together with the latter and with the clamping-ring, forms a parallelogram of levers, carries the two-armed 70 lever *f*, which holds at one end the recording-knife (or reproducing-pin) *g* and is connected at its other end, by means of a small hook *h*, to a ring *i*, which is fixed to the diaphragm *k*.

Fig. 1 shows that position of the parallelo- 75 gram in which the cross-piece *d* bears with its whole weight upon the pivot of the knife or pin lever *f*, and consequently tightens the diaphragm, so as to form an intimate contact between the knife or recording-pin *g* and the 80 roller. On increasing the distance between the diaphragm and the cross-piece *d* by rotating the radius-rods *c* downward the pressure of the cross-piece upon the lever-pivot becomes continually smaller, Figs. 2 and 3. 85 When the radius-rods have been turned down to such an extent as to be at right angles to the cross-piece, the pressure—that is to say, the tension—of the diaphragm becomes *nil*, 90 and on further rotation beyond the *nil* or zero position an actual lifting action will take place until the radius-links become vertical.

Now for the purpose of enabling the diaphragm to be moved more or less away from the roller, and thereby of imparting a different position to the radius-links *c* corresponding to the desired tension of the diaphragm, the diaphragm-casing is rendered movable by 95

means of a regulating device, which may consist—for example, as shown in Fig. 1—of a lever-arm *n*, which holds the casing *m* and is arranged to oscillate about the axis *l* and which can be adjusted by means of a regulating-screw *p*, acting upon its shoulder or short arm *o*. The regulating device may also consist of a fixed guide-rod, along which the diaphragm-casing can be screwed or fixed higher or lower, as desired.

Obviously the tension device hereinbefore described can also be connected with a one-armed knife-lever or contact pin-lever *f*, as shown in Fig. 4. In this manner the transmitted vibrations can be increased by choosing a suitable ratio between the length of the lever-arms in a well-known manner.

When compared with the loading-weight (which in phonographs heretofore employed has been constructed as a one-armed lever capable of being oscillated about a fixed point) for the pivot of the knife-lever or contact pin-lever, the apparatus herein described has the great advantage that the entire weight is compelled to share the vibrations, because it is moved parallel to itself, and it can therefore oppose a considerably-greater resistance to the said vibrations.

I claim—

1. In a phonographic producer or reproducer, the combination with the diaphragm, of a parallel motion, a stylus or reproducing-point connected with said parallel motion and the diaphragm, substantially as set forth.

2. In a phonographic producer or reproducer, the combination with the diaphragm, of a parallel motion, a lever pivoted to one member of said parallel motion and connected to the diaphragm, and a stylus or a reproducing-point on said lever, substantially as set forth.

3. In a phonographic producer or reproducer, the combination with the diaphragm, of a retaining-ring for said diaphragm, a parallel motion pivoted to said ring, a lever pivoted to the member of the parallel motion opposite said ring, one end of said lever connected to the diaphragm and a stylus or a reproducing-point carried by said lever, substantially as set forth.

4. In a phonographic producer or reproducer, the combination with the diaphragm, of a weight having motion parallel thereto, a stylus or reproducer carrying said weight and means for connecting said stylus to the diaphragm, substantially as set forth.

5. In a phonographic producer or reproducer the combination with the diaphragm, of a weight adapted to have motion in parallel directions, a lever pivoted to and adapted to support said weight and connected to the dia-

phragm, and a stylus, or reproducing-point on said lever, substantially as set forth.

6. In a phonographic producer or reproducer, the combination with the casing, the diaphragm and its retaining-ring, of a parallel motion connected to said ring, a pair of perforated ears diametrically opposite on said ring, a recessed perforated bar, links pivoted to the ends of said bar and in the ears, a lever pivoted in the recess of said bar, a stylus or reproducer on said lever, and means for connecting the lever to the diaphragm, substantially as set forth.

7. In a phonographic producer or reproducer, the combination with the diaphragm, of a parallel motion, a stylus, a reproducing-point connected with said parallel motion, and means for adjusting said parallel motion to vary the pressure on the stylus or reproducing-point, substantially as set forth.

8. In a phonographic producer or reproducer, the combination with the revoluble cylinder, the diaphragm and a lever carrying the producing or reproducing point connected with said diaphragm; of a weight to which said lever is fulcrumed, and links pivotally connecting said weight with the diaphragm-support to form a parallelogram of levers, for the purpose set forth.

9. In a phonographic producer or reproducer, the combination with the revoluble cylinder, the diaphragm and a lever carrying the producing or reproducing point connected with said diaphragm; of a weight to which said lever is fulcrumed, and links pivotally connecting said weight with the diaphragm-support to form a parallelogram of levers, and means for varying the distance between the diaphragm and revoluble cylinder, for the purpose set forth.

10. In a phonographic producer or reproducer, the combination with the revoluble cylinder, the diaphragm, its holder and a two-armed lever to the longer arm of which said holder is secured, and an adjusting-screw impinging upon the short arm of such lever to prevent rotation on its fulcrum toward the cylinder; of a lever carrying the producing or reproducing point, connected with said diaphragm, a weight to which said lever is fulcrumed, said weight linked to the diaphragm-holder to form a parallelogram of levers, substantially as and for the purpose set forth.

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

PHILIPP VON WOUWERMANS.

Witnesses:

MARTIN BERGHERBST,  
CHAS. E. CARPENTER.