

(No Model.)

J. H. WHITE.  
PHONOGRAPH RECORDER.

No. 425,840.

Patented Apr. 15, 1890.

Fig. 1.

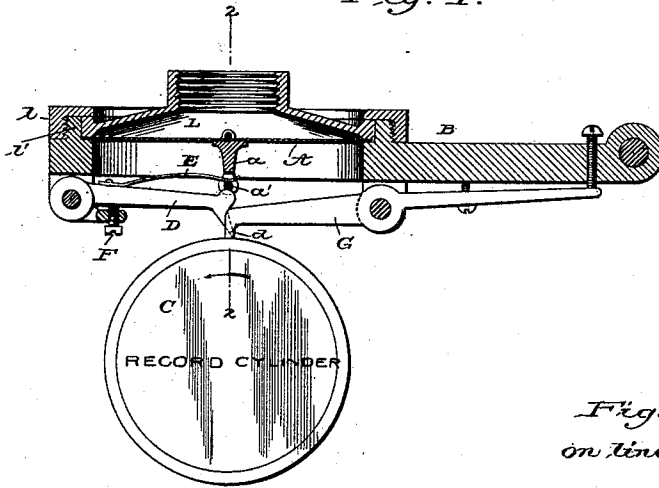


Fig. 2.  
on line 2-2

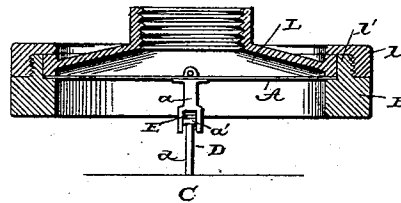


Fig. 3.

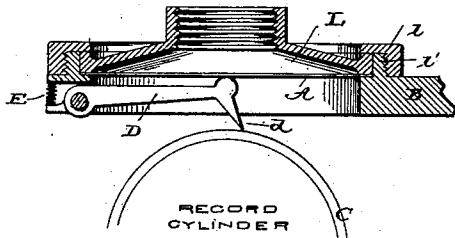


Fig. 4.

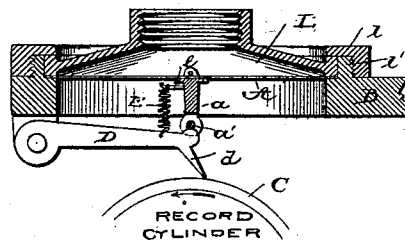


Fig. 5.

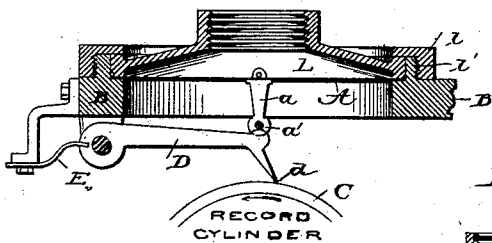
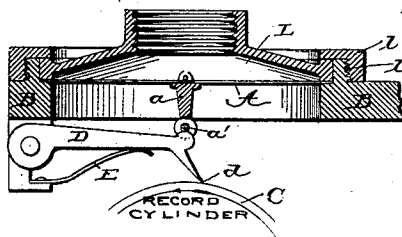


Fig. 6.



Witnesses:

W. W. Mastimer  
H. P. Kennedy.

Inventor:

Jno. H. White  
By Phil. T. Dodge  
att.

# UNITED STATES PATENT OFFICE.

JOHN H. WHITE, OF WASHINGTON, DISTRICT OF COLUMBIA.

## PHONOGRAPH-RECORDER.

SPECIFICATION forming part of Letters Patent No. 425,840, dated April 15, 1890.

Application filed June 19, 1889. Serial No. 314,813. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. WHITE, of Washington, in the District of Columbia, have invented certain Improvements in Phonographs, of which the following is a specification.

My invention relates to that class of instruments in which the recording style or cutter is mechanically operated by a diaphragm vibrated by the impact of the sound-waves thereon.

My improvement pertains to the connection of the diaphragm with the style-carrying arm or lever.

It is now the general practice to connect the diaphragm and the lever or arm which carries the recording-style positively with each other by means of an intermediate link, a stud and pivot, or by a block or cork, or similar material cemented to the two parts. In practice it is found that these connections, when closely fitted, retard the motion of the parts, or that, on the other hand, the connections wear in such manner as to permit lost motion between the diaphragm and style, the result being in either case a failure to faithfully record the feeble impulses.

My improvement is intended to overcome this difficulty; and it consists in dispensing with the links or other positive connections and arranging the diaphragm or a stud thereon to act directly upon the style-carrying lever, and in maintaining the contact between said parts by a pressure-spring.

I believe myself to be the first to arrange the diaphragm to act directly and positively on the style-carrier when reliance is placed solely upon the spring to maintain the contact.

My improvement is susceptible of embodiment in various forms, the best of which are illustrated in the accompanying drawings.

With the exception of the parts specifically claimed herein, the instrument may be of any approved form—such, for example, as that shown in my application for patent, No. 306,497, filed April 9, 1889—and I have therefore illustrated in the drawings only such parts as are necessary to an understanding of my improvements.

In the accompanying drawings, Figure 1 is a longitudinal vertical section through a recording mechanism constructed on my plan. Fig.

2 is a cross-section of the same on the line 2 2 on an enlarged scale. Figs. 3, 4, 5, and 6 are sectional views showing the improvement in other forms.

Referring to the drawings, A represents the usual recording-diaphragm, secured at its periphery in an opening in the sustaining-arm B, which may be mounted in any ordinary or suitable manner to carry the diaphragm over the record-cylinder C or other record-surface.

D is the style-carrying arm or lever located between the diaphragm and record-cylinder, with one end pivoted or otherwise attached to the arm B or equivalent support and the opposite end provided with the recording style or cutter *d*, which may be attached rigidly thereto or formed integral therewith. The arm vibrates freely to and from the cylinder. On its upper or outer edge the free end of the arm rests against the lower end of a stud or projection *a*, fixed rigidly to the center of the diaphragm, its contact with the stud being maintained by a lifting-spring E. When the diaphragm moves toward the record-surface it acts directly and positively to carry the style downward and deepen the record-groove; but as the diaphragm reacts the spring lifts the arm and style, maintaining the contact between the diaphragm and arm and diminishing the depth of the groove.

In Figs. 1 and 2 the stud *a* has its lower end forked to straddle the arm and provided with the fixed transverse pin *a'*, which serves not only as the bearing for the arm, but also as the bearing for the lifting-spring, which in this instance is of flat form, with one end fixed to the back of the arm and the other seated on top of pin *a'*. The arm in this case is pivoted to the diaphragm-support B, so that the latter may be adjusted in the customary manner to vary the depth of cut without changing the relations of the diaphragm style and lever.

The movement of the arm and style toward the record-cylinder is limited by an adjustable stop-screw F, seated in the arm B. I prefer to support the arm B by a rest G adjustably secured thereto and bearing at one end upon the surface of the record-cylinder, as in my application above referred to. It is found that when the gravitating arm B is thus sustained my devices give their best results.

In the form of device shown in Fig. 3 the end of the style-carrying arm or lever D bears directly upon the center of the diaphragm, being held in contact therewith by the spiral spring E, seated between the rear end of the arm and the supporting-frame B.

In the device shown in Fig. 4 the style-carrying arm pivoted to the frame B, as in the preceding forms, bears against the end of the stud *a*, projecting rigidly from the diaphragm, so as to be carried downward positively thereby. Contact is maintained and the arm and style lifted by the spiral spring E, connected at one end to the arm or lever and at the opposite end to an arm *e*, projecting from the diaphragm-stud *a*. It will be observed that in this device the lifting-spring is carried directly by the diaphragm, the spring, stud, and the end of the lever moving together and to an equal extent.

In Fig. 5 the end of the lever rests against the stud fixed to the diaphragm, as in Figs. 1 and 4; but the lifting-spring E is in this case of flat form, with one end fixed to the frame B and the opposite end seated in a notch in the style-carrier in rear of its pivot.

In Fig. 6 the style-carrier bears against a stud fixed on the diaphragm, as in the preceding examples; but the lifting-spring E, of flat form, is applied to the frame and acts beneath the carrier to hold it in contact with the stud.

It is to be noted that in each of the preceding examples the contact between the style-carrier and the diaphragm is maintained solely by the spring. This prevents lost motion, maintains a close contact at all times, and admits of the diaphragm rising independently of the style in the event of the latter being engaged by the record or otherwise held in such manner as to prevent it from lifting readily.

It is to be understood that the essence of my invention consists in seating the style-carrier loosely against the diaphragm or a rigid projection thereon, and in lifting the style to maintain its contact by a spring, and that these parts may be embodied in any form, the mechanical equivalent of those herein shown.

In assembling the parts it is necessary to prevent the diaphragms from turning within the supporting-frames out of their proper positions. Under ordinary constructions much difficulty is experienced in this regard. To avoid this trouble, I adopt the constructions shown in Figs. 1 to 6. The diaphragm is seated in a circular recess in the upper side

of the supporting-frame upon sustaining-shoulders, as usual. The conical cap or chamber L, instead of being threaded at the periphery and screwed on the diaphragm, as usual, is seated into the recess in the frame upon the edge of the diaphragm and confined in place by an independent internally-threaded ring *l*, which overlaps the outer edge of the cap L, and is screwed upon the outside of a flange *l'* on the frame. This construction admits of the diaphragm being accurately adjusted, and of the cap L being inserted squarely to its place and held down by hand, so as to keep the diaphragm from turning while the fastening-ring is screwed home to its place.

Having thus described my invention, what I claim is—

1. The combination of diaphragm, the style-carrier seated loosely against the diaphragm or a rigid projection thereon, and a spring to maintain the contact of said parts.

2. The combination of diaphragm, the style-carrying arm pivoted at one end and removably seated at the opposite end against the diaphragm or a projection thereon, and a spring to maintain the contact carried at one end with the diaphragm and attached at the opposite end to the style-carrier.

3. In combination with the record-cylinder, the style-carrying arm pivoted at one end, the stop to limit its advance toward the cylinder, the spring to lift the style from the cylinder, and the diaphragm acting upon but unsecured to the style-carrier, whereby the carrier and diaphragm are held in close contact, but permitted to separate and move independently under abnormal conditions.

4. In combination with the record-cylinder, the gravitating frame B, with a support riding on the cylinder, the diaphragm, the independent pivoted style-carrying arm pivoted to the gravitating frame, and the lifting-spring acting to hold the arm in contact with the diaphragm.

5. The arm recessed to receive the diaphragm and provided with the externally-threaded flange, in combination with the diaphragm, the cap seated in the recess thereon, and the ring screwed upon the flange and confining the edge of the cap, as shown.

In testimony whereof I hereunto set my hand this 6th day of June, 1889, in the presence of two attesting witnesses.

JNO. H. WHITE.

Witnesses:

W. W. MORTIMER,  
W. R. KENNEDY.