

No. 624,625.

Patented May 9, 1899.

A. C. CLARK & E. R. JOHNSON.
SOUND RECORDING AND REPRODUCING MACHINE.

(Application filed Jan. 9, 1897.)

(No Model.)

Fig. 1.

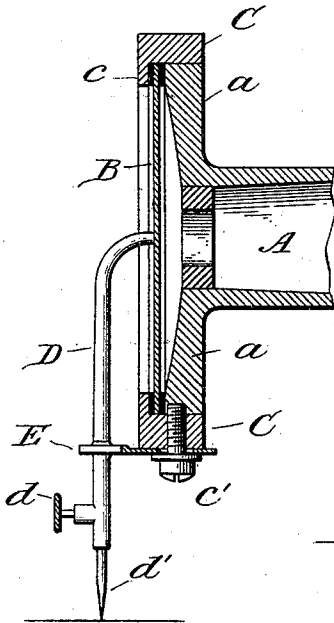


Fig. 2.

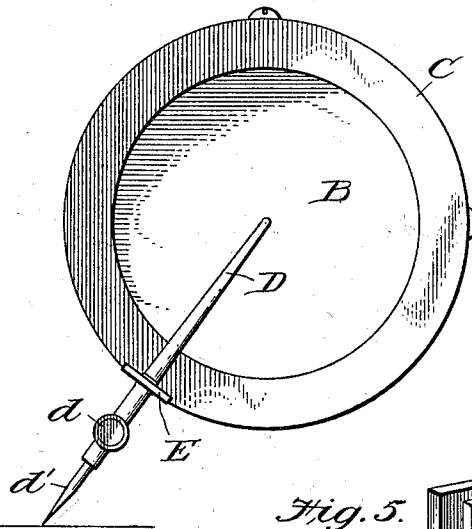


Fig. 5.

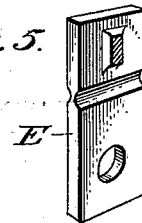


Fig. 3.

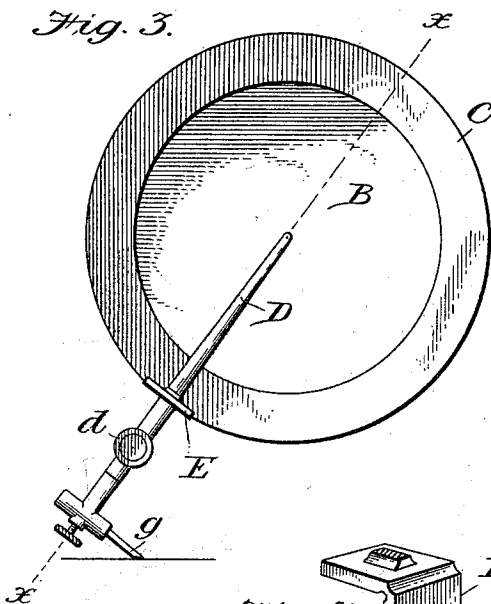


Fig. 4.

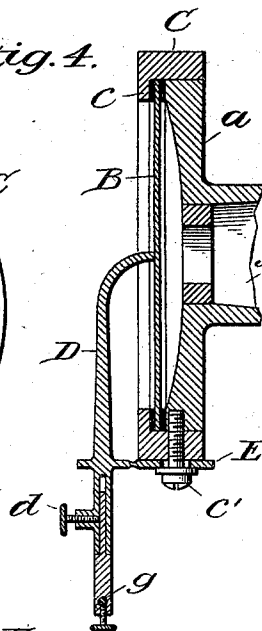


Fig. 6.

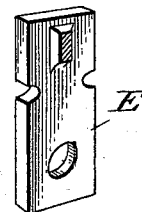
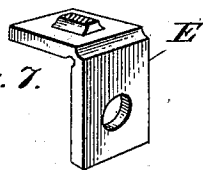


Fig. 7.



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UNITED STATES PATENT OFFICE.

ALFRED CORNING CLARK, OF NEW YORK, N. Y., AND ELDRIDGE R. JOHNSON,
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SOUND RECORDING AND REPRODUCING MACHINE.

SPECIFICATION forming part of Letters Patent No. 624,625, dated May 9, 1899.

Application filed January 9, 1897. Serial No. 618,539. (No model.)

To all whom it may concern:

Be it known that we, ALFRED CORNING CLARK, a resident of the city of New York, State of New York, and ELDRIDGE R. JOHNSON, a resident of the city of Camden, State of New Jersey, citizens of the United States, have invented certain new and useful Improvements in Sound Recording and Reproducing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

Our invention has relation to and has for its object to provide a construction for producing clearer records and for reproducing the sounds from the records in clearer and more distinct tones than in constructions heretofore known.

Our invention consists in the devices hereinafter particularly described and claimed.

In the accompanying drawings, Figure 1 represents a construction embodying our invention, partially in longitudinal section. Fig. 2 is a face view of the same. Fig. 3 is a face view of a construction embodying our invention with a cutting-tool adapted for record-making purposes. Fig. 4 is a sectional view of the same on the lines *xx*, Fig. 3. Figs. 5, 6, and 7 are enlarged detail views of preferred forms of plates for supporting and securing the needle-bar in position upon the diaphragm-frame.

Referring to the drawings, A is the tubular section of the diaphragm support or frame, having the disk-shaped shoulder *a*, preferably slightly concaved on its outer face, and adapted to receive and hold the diaphragm B in the position shown in the drawings through the medium of a flanged ring C, provided on the circumference of the disk-shaped shoulder *a*, the edge of the diaphragm B being secured in place by the flange *c* of the ring C against the outer edge of the shoulder *a*. We preferably provide, as usual, a small rubber ring on each side of the diaphragm, at its outer edge, at the point of contact when secured in position by the flange *c*. The ring C is held in position upon the shoulder of the frame A by a screw *c'* or by other suitable means. The needle-bar or stylus D is supported upon the

diaphragm-frame in such a manner that the opposite ends may be free, one end to come in contact directly or indirectly with the outer face of the diaphragm B at or near its central portion and the other end to engage upon the recording-surface for record making or reproducing purposes. At a point preferably about midway between the upper end of the stylus-bar and the recording-point (though the location may be varied at will) we provide a supporting-plate E, adapted to yield slightly under the vibrations caused in recording or reproducing the sound-waves. The plate E is secured to the diaphragm-casing in a desirable manner at any desirable point, as at the point shown in Fig. 1. As shown in Fig. 1, the orifice in the plate E through which the screw *c'* passes is enlarged and of greater area than the diameter of the screw. This is to allow of adjustment of the plate E at the point of support to regulate the length of the free or outwardly-extending portion of the supporting-plate E. The said plate E is constructed so as to yield slightly to the vibrations of the stylus-bar, and in order to regulate the sensitiveness of the said plate E to the desired degree we preferably groove it on either or both faces, as illustrated in Fig. 5 or Fig. 6, or, as illustrated in Fig. 7, at a point in the free end, as therein shown, though these grooves are not essential to our invention, as the supporting-plate E may be reduced to a uniform thickness throughout and adapted to yield and accomplish the desired results, as illustrated in Fig. 1.

The supporting-plate E, as stated, is adapted to yield slightly to the vibration of the stylus-bar and is in the nature of a stiff spring. It is so constructed and tensioned that although yielding slightly the resistance is sufficient to overcome the tendency of the stylus-bar to too great momentum and vibration, and it thus acts as a damper or check upon the needle-bar and is practically rigid to resist strain brought to bear against it in a lateral or sidewise direction.

The stylus-bar D at its lower end is preferably longitudinally bored and provided with a thumb-screw *d* for the reception and securing of a removable needle-point *d'* or cutting-

tool. The points of the needles are apt to wear and must be occasionally removed for sharpening and replacing. It is apparent that in this construction the length of the lower arm of the stylus-bar may thus be varied, so that, considering the supporting-plate E as the fulcrum, by the lengthening or shortening of the lower arm by means of the adjustable needle *d'* and the thumb-screw *d* the length of the vibration of the upper end of the stylus-bar caused by the pulsations of the diaphragm may be increased or diminished at the lower point of the needle in recording or reproducing, so, as a result, to modify the intensity of the sound in reproducing.

In the construction shown in Fig. 1 the upper end of the stylus-bar D is simply turned inwardly to come in contact with the diaphragm at the desired point, though other forms of connection with the diaphragm may be employed.

In Fig. 7 the stylus-bar support is formed at an angle, the upwardly-extending portion being secured to the stylus-bar parallel therewith.

In Figs. 3 and 4 we illustrate a modified construction of cutting-tool holder provided at the lower end of the stylus-bar, forming a substantially T-shaped end, the cutting-tool *g* being secured by a thumb-screw in the cross-section which is bored for its reception. This cutting-tool *g* is of the ordinary construction of a cutting-tool adapted in producing records upon the record-plates to remove the material in the form of a shaving where the material is desired to be removed.

Our invention is adapted to sound recording and reproducing machines where the records are made upon rotating disks or revolving cylinders and the original sound reproduced therefrom, and is not limited to any particular pattern of machine.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a sound recording and reproducing machine, a stylus adjustable in its length comprising a main bar and removable point-section, the point portion being adapted to telescope within the main bar, means for securing the two parts together in their adjusted position, the upper end of the main bar being phonetically connected with the diaphragm of the sound-box, and an adjustable spring-plate secured to the said stylus-bar intermediate in the length thereof carrying said stylus and tensioned to properly yield to the sound-vibrations, said spring-plate being adjustable lengthwise and means for securing the plate in position, substantially as described.

2. A yielding stylus-bar support for sound recording and reproducing machines, comprising a metallic spring-plate adapted to be secured at its opposite ends to a fixed point and to the stylus-bar respectively, means for adjusting the said plate lengthwise, said plate having its cross-sectional area reduced at

about midway of its length to such an extent as to give to the spring its proper stiffness, substantially as described.

3. In a sound recording and reproducing machine, a stylus-bar, a yielding support for the same rigidly attached at one end to the stylus-bar intermediate in the length thereof having provided near the opposite or secured end of the yielding support an enlarged orifice, a securing screw or pin adapted to be passed therethrough of a diameter less than the diameter of the said orifice to provide for a forward and backward adjustment of the yielding support to regulate the length of the free or outer portion of the same extending beyond the point of attachment to the frame of the machine, said yielding support having its cross-sectional area reduced about midway of its length, substantially as described.

4. In a sound recording and reproducing machine, a stylus-bar, D, formed inwardly at its upper end, to the diaphragm, the lower end of said bar, D, being longitudinally bored, a needle-point adapted to said bore, a thumb-screw, *d*, provided in the lower end of the bar, D, for securing the said point adjustably therein to regulate the combined length of the point and bar to allow the point to be readily adjusted or removed, a yielding plate, E, rigidly secured to the bar, D, at one end, and adjustably mounted upon the recording or reproducing frame to regulate the length of the free end of said yielding plate, E, and means for securing the said yielding plate upon the said frame, substantially as described.

5. In a sound recording and reproducing machine, a stylus-bar, D, having its upper end phonetically connected with the diaphragm, a longitudinally-disposed bore provided in the lower end thereof, and a needle-point adapted to said bore, a thumb-screw, *d*, provided in the lower end of said arm for securing the point adjustably therein, a securing-screw, *c*, a yielding plate, E, rigidly secured at one end to the bar, D, an enlarged orifice provided in the opposite end of said plate, E, of greater area than the diameter of the securing-screw adapted to pass therethrough to allow of the said plate, E, being adjustably secured upon the frame of the machine to regulate to a nicety the length of the free end of the plate, said plate, E, having its cross-sectional area reduced at about midway of its length, substantially as described.

6. In a sound recording and reproducing machine, a spring-mounting for the stylus-bar adjustable lengthwise secured at one end to the stylus-bar and at its opposite end to the casing of the sound-box.

7. In combination with a sound recording and reproducing machine having a sound-box, diaphragm, a stylus-bar connected at its upper end with the said diaphragm, and a spring-supporting plate for securing the stylus-bar upon the sound-box said stylus-bar having a longitudinal orifice provided in the

lower end thereof, and thumb-screw provided
in said lower end, a T-shaped section for
holding the cutting-stylus adjustably secured
in said orifice in the lower end of the stylus-
5 bar through the medium of the said thumb-
screw, said T-shaped cutting-stylus section
having the lower cross member longitudinally
bored for the reception of the cutting-stylus,
a cutting-stylus, *g*, provided in said orifice
10 and thumb-screw adapted in said cross mem-

ber for securing the cutting-stylus in position, substantially as described.

In witness whereof we have hereunto set our hands this 8th day of January, A. D. 1897.

ALFRED CORNING CLARK.
ELDRIDGE R. JOHNSON.

Witnesses:

JNO. E. PARKER,
ELIAS H. WHITE.