W. O. C. ELLIS.

SOUND REPRODUCING APPARATUS.

APPLICATION FILED JAN. 31, 1908.

918,487. Patented Apr. 13, 1909.

Fig. 1.

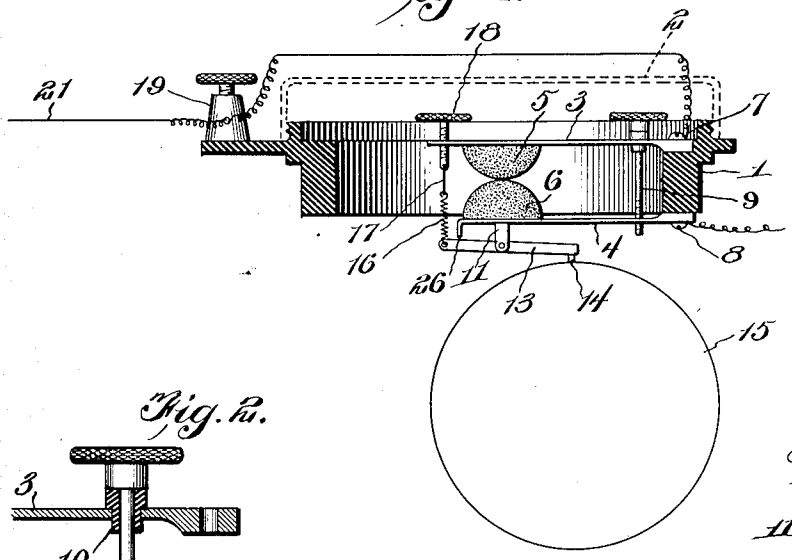


Fig. 2.

Fig. 3.

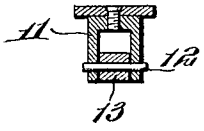
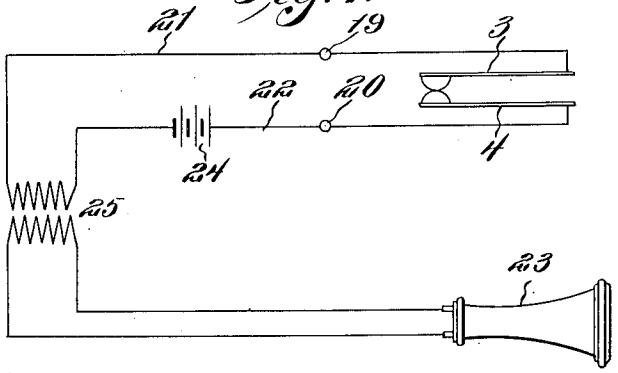


Fig. 4.



Witnesses

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SOUND-REPRODUCING APPARATUS.

No. 918,487. Specification of Letters Patent. Patented April 13, 1909.

Application filed January 31, 1908. Serial No. 413,711.

To all whom it may concern:

Be it known that I, WILLIS O. C. ELLIS, a citizen of the United States, residing near Greenfield, in the county of Highland and State of Ohio, have invented new and useful Improvements in Sound-Reproducing Apparatus, of which the following is a specification.

This invention relates to sound reproducing apparatus, the object of the invention being to provide a practical and efficient device for reproducing sounds from a sound record and transmitting the same to a telephone receiver, the parts of the apparatus being so constructed, combined and arranged that the reproduction is rendered exact and transmitted to the receiver which may be situated at any distance from the reproducer such as an adjoining room or building or at materially greater distance.

With the above general object in view, the invention consists in the novel construction, combination and arrangement of parts as herein fully described, illustrated and claimed.

In the accompanying drawing:—Figure 1 is a sectional view of the reproducer. Fig. 2 is a detail section showing the manner of insulating the initial pressure regulating screw. Fig. 3 is a detail section illustrating the connection between one of the contact supporting springs and the stylus carrier. Fig. 4 is a diagrammatic view, showing the contact points of the reproducer, the receiver and the electrical connections.

Referring to the drawings, 1 designates the body of the reproducer which is of open center formation and composed of suitable material having no electrical conductivity, said body being designed to be closed at one side by means of a suitable cover 2 indicated by dotted lines in Fig. 1.

Secured to the body 1 in opposite relation to each other are springs 3 and 4 which support contact points 5 and 6 both of which are preferably composed of carbon as indicated in Fig. 1. These springs are secured fixedly to the body 1 by screws 7 and 8 or their equivalent while the opposite ends which support the contact points 5 and 6 are left free or unsupported.

9 designates an initial pressure regulating screw which passes through the spring 3 and engages a threaded opening in the spring 4 at a distance comparatively near the fixed ends of the springs, as shown in Fig. 1. Where the screw 9 passes through the spring 3, it is insulated therefrom by a bushing 10 of hard rubber or its equivalent to avoid electrical connection between the springs at such point. To the other spring 4 there is applied a pivot lug 11 which carries a pivot pin 12 on which is fulcrumed a stylus carrier 13, the said carrier being pivotally mounted at a point intermediate its ends and carrying at or near one extremity a stylus 14 adapted to move in contact with a sound record which is shown at 15 in Fig. 1 in the form of a cylinder. To the opposite end of the stylus carrier 14 is attached one end of a tension spring 16 to the opposite end of which is attached a non-conducting strand 17 which may be of silk or other suitable material, the strand 17 being connected at its opposite end to the extremity of an operative pressure regulating screw 18 which passes through a threaded opening in the extremity of the spring 3. It will be seen that by turning the screw 18, the tension of the spring 16 may be accurately adjusted to regulate the operative pressure between the carbon contacts 5 and 6 when the stylus carrier is actuated by the stylus and sound record 15 during the rotation of the latter.

Under the preferred embodiment of the invention, the reproducer body 1 is provided with a plurality of binding posts 19 and 20 to which wires lead respectively from the screws 7 and 8 which are in electrical contact with the springs 3 and 4. Circuit wires 21 and 22 lead off from the binding posts 19 and 20 to a telephone receiver 23, the said circuit including a battery 24 and an induction coil 25 involving primary and secondary windings.

By reason of the construction and arrangement above described the entire current which enters the reproducer must necessarily flow through the carbon contacts and it will be noted that the carbon contacts are subjected to undulatory pressure. When the reproducer is in use the stylus moves up and down in accordance with the projections and depressions in the grooves of the sound record. When the stylus is brought into contact with the projection or bump on the record, said stylus together with the end of the stylus carrier rises while the opposite end of the carrier moves downward. This causes the carbon contact or button 6 to be pushed upward against the contact 5 and since the opposite end of the stylus carrier is connected by the spring 16 and strand 17

to the spring 3 by means of the screw 18, the carbon button 5 is pulled downward against the button 6. Therefore, each upward movement of the stylus causes the carbon buttons to be momentarily pressed together. This causes a greater amplitude in the electrical resistance of the carbon contacts and, therefore, of the sound waves than would be produced were the contact 5 held perfectly rigid.

The extremity of the spring 4 is bent at an angle to form a stop 26 which prevents the stylus from remaining on the record when the reproducer is raised. The tension of the spring 16 keeps the carrier in contact with the stop 26 when the stylus is not resting on the record. By means of the arrangement described, musical sounds as well as articulate language may be correctly reproduced and transmitted to the receiver and the latter may be located at any distance from the reproducer. The essential feature of the invention resides in subjecting the body of carbon to varying pressure mechanically transmitted thereto by the raised and depressed portions of the sound record thus causing a telephone receiver, when actuated by a current passing through the carbon contacts or buttons or their equivalent to reproduce the sound or sounds which caused the impression to be made on the record.

When a phonograph is equipped with the form of reproducer above described, it will be apparent that it is not necessary to have the receiver in the same room with the reproducer or even in the same building. All that is necessary is to place a suitable device such as a multiphone at the place or places where the reproduction is to be heard and connect the same by wires with the secondary winding of the induction coil. For dictation purposes, it is not necessary for the typewriter operator to be in the same room with the dictator as the operator may remain at his or her desk at any distance from the reproducer and hear the words as distinctly as if located immediately adjacent to the reproducer. Several receivers may be connected to the reproducer and the reproductions received by a corresponding number of parties at different points without interference.

While I have specified carbon as the material subjected to undulatory pressure, it will be obvious that any suitable material having the necessary properties and electrical conductivity may be substituted in place of the carbon.

Having thus described the invention, what is claimed as new, is:—

1. Sound reproducing apparatus comprising a reproducer provided with spring contact arms, contact points secured to the ends of said arms, an initial pressure regulating screw extending through said arms and insulated therefrom, a stylus carrier pivoted to one of said spring arms, a spring connected to one end of said carrier, a regulating screw connected to said spring by a non-conducting strand, said regulating screw being mounted in one of the spring contact arms, and an undulatory transmitting surface including varying resistance contacts.

2. A sound reproducing apparatus comprising a reproducer casing, spring contact arms secured to said casing, an initial pressure regulating screw passing through said spring arms and insulated therefrom, carbon contact points on the ends of said springs, a stylus carrier pivotally connected to one of said spring arms, a stop on the last mentioned spring arm, a spiral spring connected to said stylus carrier, a strand or filament connected to said spring, a regulating screw connected to said strand, said screw being mounted in one of said spring arms, an electric circuit including varying resistance contacts, and a telephone receiver in said circuit.

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

WILLIS O. C. ELLIS.

Witnesses:
C. S. ELLIS,
W. E. KNEDLER.