

W. O. C. ELLIS.  
SOUND REPRODUCING APPARATUS.  
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918,304.

Patented Apr. 13, 1909.

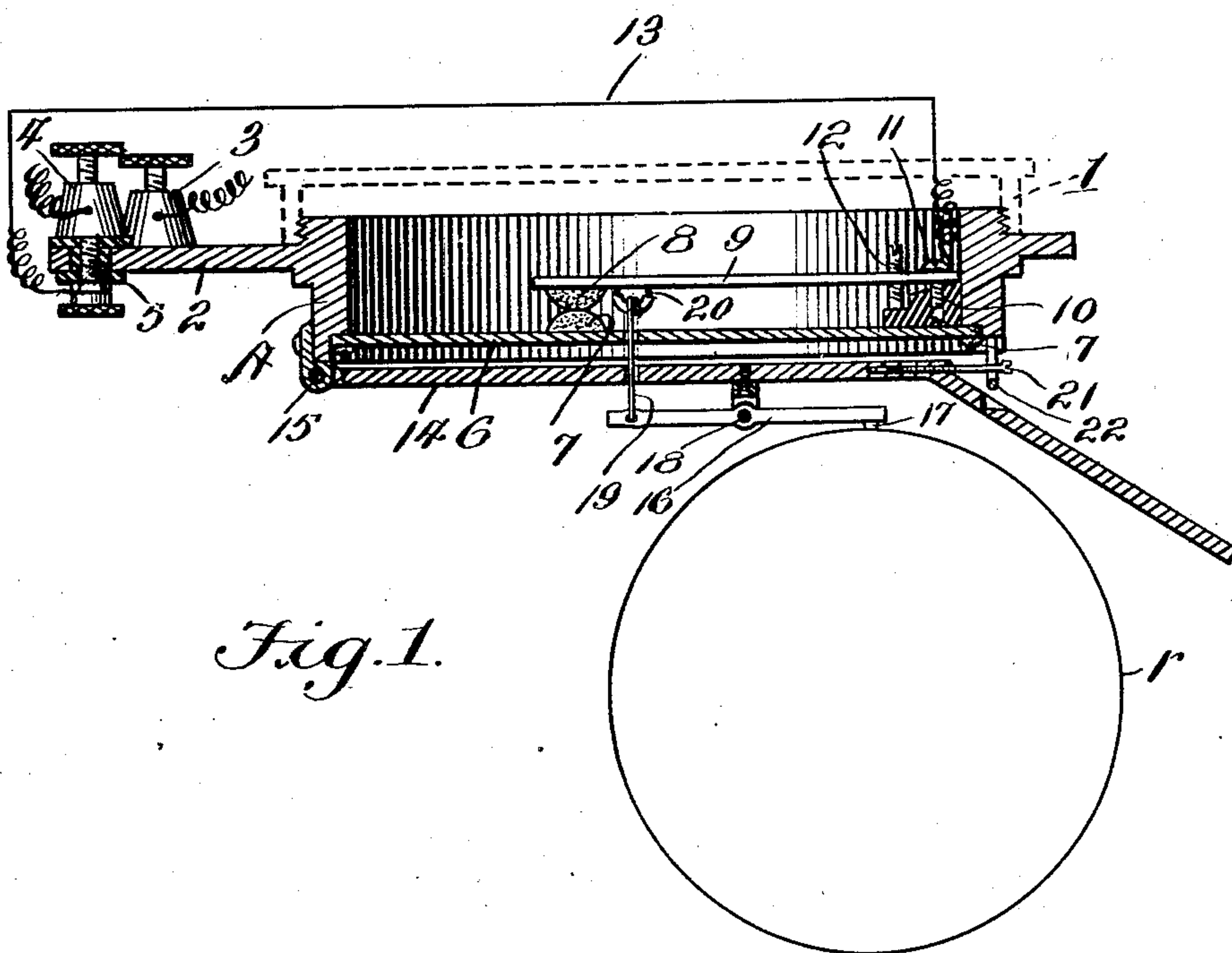
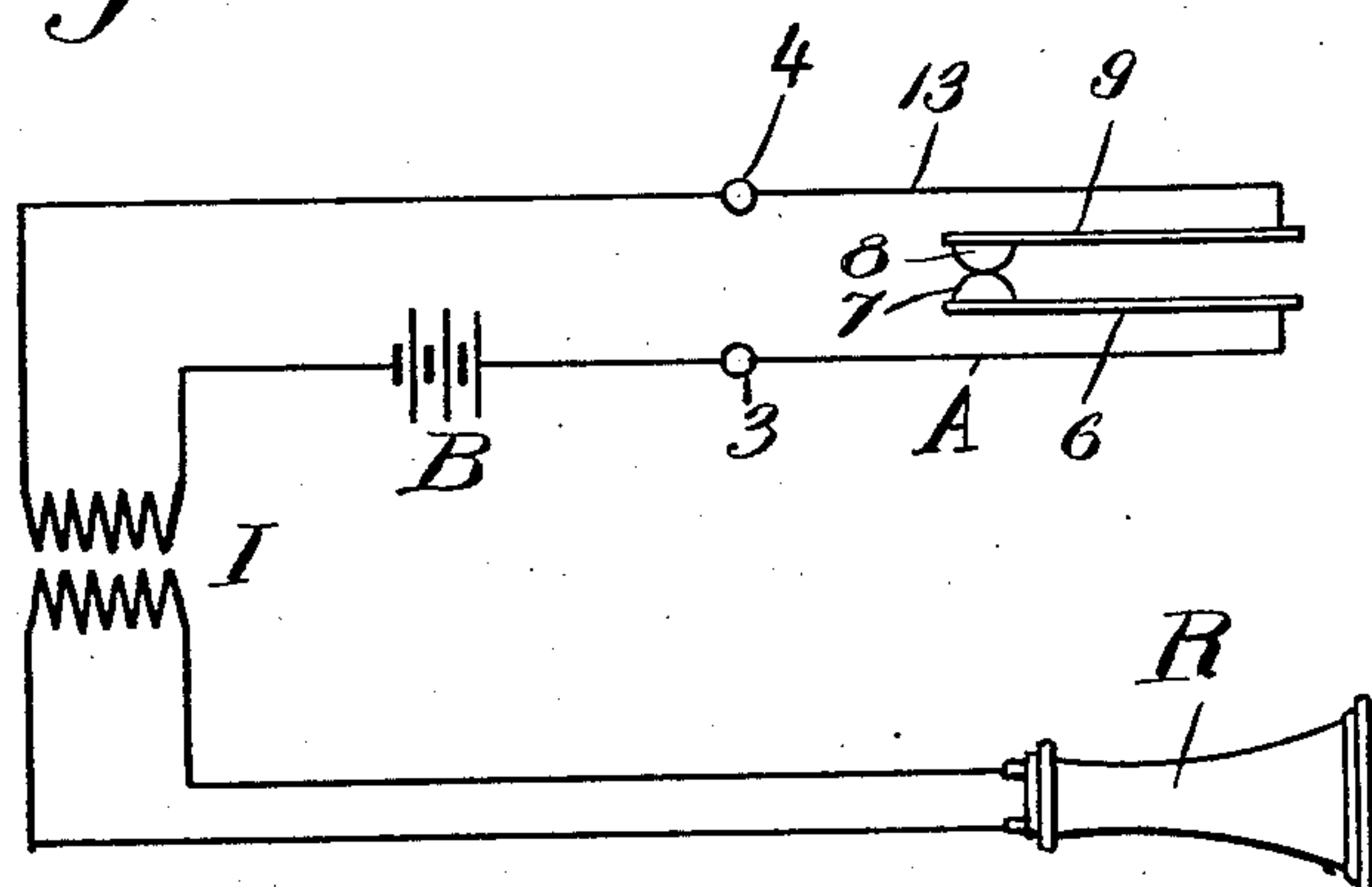


Fig. 1.

Fig. 2.



Inventor

Willis O. C. Ellis,

Witnesses

J. T. L. Wright,  
C. Bradway.

By Victor J. Evans,

Attorney



# UNITED STATES PATENT OFFICE.

WILLIS O. C. ELLIS, OF NEAR GREENFIELD, OHIO.

## SOUND-REPRODUCING APPARATUS.

No. 918,304.

Specification of Letters Patent.

Patented April 13, 1909.

Application filed December 23, 1908. Serial No. 468,978.

*To all whom it may concern:*

Be it known that I, WILLIS O. C. ELLIS, a citizen of the United States, residing in the county of Fayette, 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 a sound-reproducing apparatus of the general type disclosed in my pending application Serial No. 413,711, and has for one of its objects to improve and simplify the construction of devices of this character so as to be comparatively simple and inexpensive to manufacture, reliable and efficient in use, and adapted for reproducing sound from a sound-record in a practical, simple and satisfactory manner, the device being applicable for use in transmitting sound from one point to another by an ordinary telephonic receiver, or for use in connection with a wireless telephone by connecting the device with the sending apparatus of the wireless telephone system.

Another object of the invention is the provision of a novel arrangement of pressure contacts which sets up an undulatory current by varying the resistance of the circuit in which the contacts are connected, the pressure between the contacts being varied by a stylus operatively related to the contacts and riding on an undulatory record surface.

With these objects in view and others, as will appear as the description proceeds, the invention comprises the various novel features of construction and arrangement of parts which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawing, which illustrates one embodiment of the invention, Figure 1 is a central vertical section of the device. Fig. 2 is a diagrammatic view of the circuit connections.

Similar reference characters are employed to designate corresponding parts throughout the views.

Referring to the drawing, A designates a metallic annular casing or shell on which is threaded a dust-excluding cap or cover 1. Supported on a lug 2 of the shell are binding posts 3 and 4, the former of which is electrically connected with the shell while the latter is insulated therefrom by insula-

tion 5. These binding posts, as shown in Fig. 2, are connected in circuit with a telephone receiver R through an induction coil or transformer I, there being a source of current such as a battery B in the primary circuit of the system.

Arranged in the shell is a diametrically-disposed metallic strip 6 secured at its ends by screws 7 to the shell, and on this strip is a fixed contact or carbon button 7. Bearing on this button is a movable contact or carbon button 8 arranged on the free end of a leaf spring 9 disposed above the strip 6 and secured to a block of insulation 10 arranged in the casing or shell A. This spring is secured to the block by a screw 11 which serves as a means for the initial adjustment of the tension of the spring, the surface of the block under the spring being inclined so that the turning of the screw in one direction or the other will change the position of the spring 9 and hence vary the pressure between the contact buttons. A second adjusting screw 12 for fine regulation may be employed, said screw being threaded in the spring 9 and bearing on the block of insulation 10, and this screw coöperates with the screw 11 for effecting a nice adjustment of the pressure between the contacts. The screw 11 also serves as a binding post for connecting the spring 9 with the binding post 4 through a wire or conductor 13.

Disposed under the member 6 is a lever 14 fulcrumed at 15 and extending to the opposite side of the casing, the said lever constituting a weight for maintaining the stylus carrier 16 in such position that the stylus 17 will ride on the record r. The stylus carrier is fulcrumed at 18 on the weight 14, and the end of the carrier opposite from the stylus is connected by a wire or equivalent means 19 with the contact-carrying spring 9, the wire being attached to a loop 20 on the spring and insulated from the latter by applying insulation to the loop. The lever or weight 14 is prevented from dropping when the reproducer is raised from the record r by a screw or projecting member 21 on the lever that engages a stop 22 on the shell or casing A.

In operation, the movement of the record causes the stylus to rise and fall with the undulations in the surface of the record and this rising and falling of the stylus tilts the lever or carrier 16 so as to cause the spring 9 to vibrate in harmony with the



undulations in the record. The pressure between the contacts 7 and 8 will thus be varied so that the resistance of the circuit will change in accordance with the variation in the pressure between the contacts whereby an undulatory current will be produced. This undulatory current so acts on the telephonic receiver R as to emit a sound which is an exact reproduction of that which caused the impressions on the record.

From the foregoing description, taken in connection with the accompanying drawing, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the device which I now consider to be the best embodiment thereof, I desire to have it understood that the device shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims appended hereto.

Having thus described the invention, what I claim is:—

1. In a sound-reproducing apparatus, the combination of a supporting structure, a fixed contact, a movable contact bearing on the first, means for adjusting the pressure between the contacts, a weight, a stylus carrier mounted on the weight, and a connection between the stylus carrier and movable contact for varying the tension of pressure between the contacts in accordance with the movement of the said carrier.

2. In a sound-reproducing apparatus, the combination of a supporting body, a member fixed thereon, a contact on the member, a

spring contact on the spring bearing on the first-mentioned contact, means for adjusting the tension of the spring, a stylus carrier, a support for the stylus carrier arranged to hold the stylus against a record, and a connection between the stylus carrier and spring.

3. The combination of a supporting body, a metallic supporting body, a conducting strip secured to the body, a contact on the strip, a spring insulated from the body and strip, means for varying the tension of the spring, a contact on the spring bearing on the first-mentioned contact, a lever mounted on the body and constituting a weight, a stylus carrier fulcrumed on the lever, a connection between the carrier and spring, and means for connecting the spring and said body in circuit with a telephonic receiver.

4. The combination of a supporting body, a fixed member thereon, a contact carried by the member, a spring disposed at one side of the member, a contact on the spring bearing on the first-mentioned contact, means for adjusting the tension of the spring, a movable member constituting a weight disposed at the opposite side of the said fixed member from the spring, a stylus carrier mounted on the weight member, a connection between the stylus carrier and spring, and means for preventing the weight member from dropping when the device is removed from the record.

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

WILLIS O. C. ELLIS.

Witnesses:

CONDE ELLIS,  
W. E. KNEDLER.