Jan. 17, 1928. 1,656,424

B. E. COVER

PHONOGRAPH

Filed July 22, 1922

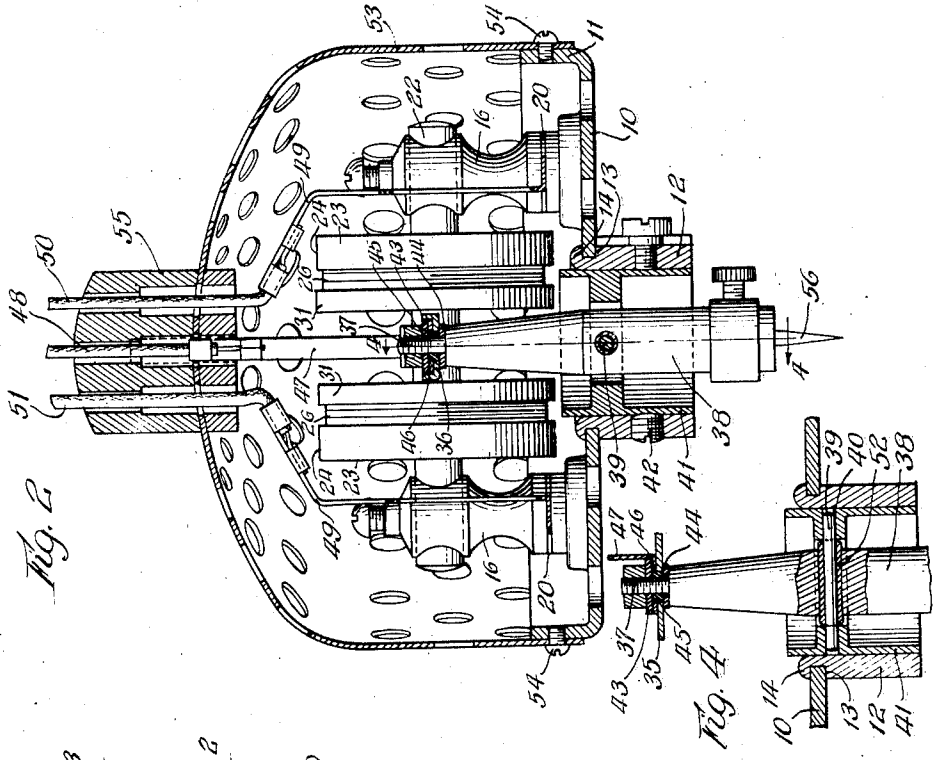


Fig. 2

Fig. 4

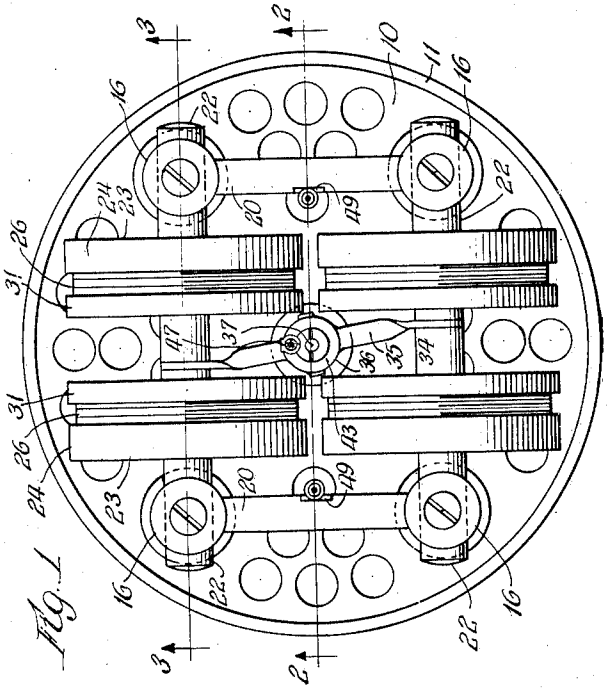


Fig. 1

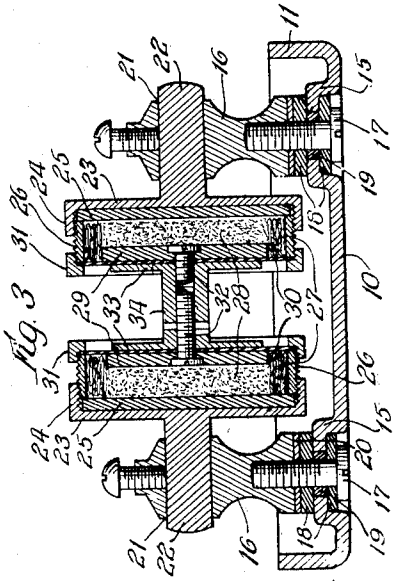


Fig. 3

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UNITED STATES PATENT OFFICE.

BERKEY B. COVER, OF CHICAGO, ILLINOIS.

PHONOGRAPH.

Application filed July 22, 1922. Serial No. 576,691.

This invention relates to phonographs and has for its principal object to amplify the vibrations set up in the stylus bar by a phonograph record and transform them into electric waves capable of operating a telephone or other sound receiver.

A further object of the invention is to provide an electrical reproducer for phonographic records embodying the principles of the microphone.

A further object of the invention is to provide a reproducer in which a stylus bar mechanically operates a plurality of microphones, from which it is electrically insulated.

Further objects of the invention will become apparent as the description is read in connection with the accompanying drawing illustrating a selected embodiment of the invention, and in which

Fig. 1 is a plan view of a reproducer embodying the invention with the cover removed;

Figs. 2 and 3 are sectional views taken on the lines 2—2 and 3—3 respectively of Fig. 1; and

Fig. 4 is a sectional view on the line 4—4 of Fig. 2.

Referring to the reference numerals on the drawing, 10 indicates a base, here shown as made of stamped metal and comprising a disk having a cylindrical flange 11 at its periphery and a tubular flange 12 surrounding its central opening. Flange 12 is here shown as a separate cylinder reduced to form a shoulder 13 and upset at 14 to secure the flange to the disk. A plurality of bosses 15 are stamped or pressed up from the disk to which are secured posts 16 by screws 17. Preferably the posts are insulated from the base by means of washers 18 and the tube 19 which prevent contact of the posts and the screws with the base. In the embodiment shown, four of these posts are electrically connected in pairs by strips 20 lying between the upper washers 18 and the bottoms of the posts 16 and securely clamped by the screws 17. Each post is equipped with a transverse bore 21 which receives the shank 22 of a carbon cup member 23 here shown in the form of a disk, having a peripheral flange 24. A fixed carbon electrode 25 rests against each of these disks and is secured in place by a nipple 26 threaded into the flange 24 and bearing against the periphery of the electrode. Within the nipple 26 is an annular ring 27 of loose asbestos fibre surrounding a suitable quantity of granules of conductive material 28 such as carbon or coke. A movable electrode 29 cooperates with the fixed electrode 25 of each carbon cup to press and release the granules and thereby vary the conductivity of the cups. The movable electrode 29 lies against a diaphragm 30 of mica or other suitable material which is held in place by a threaded cap 31. A screw 32 passes through each electrode 29, diaphragm 30 and into a diaphragm plate 33 which has a tubular shank 34. The shanks 34 of opposed microphones are of slightly different length as indicated in Fig. 3 and screws 32 vary in length to correspond. The longer screw 32 passes through one end of a connecting bar 35 here shown in Fig. 1 by which the two pairs of microphones are connected for operation in unison, facing one another, and with the movable electrodes substantially parallel to each other. The middle portion of this bar is enlarged as indicated at 36 and perforated to receive the threaded end 37 of a stylus bar 38 pivoted on a pin 39 passing through aligned openings in the internally flanged liner 41 secured in the tube 12 by the set screw 42. In order to insulate the stylus bar from the microphones, I provide the washers 43 and 44 and the sleeves 45 of insulating material which prevent contact between the stylus bar and the connecting bar 35. For convenience the sleeve 45 is made long enough to receive the perforated end 46 of a connector 47 to which the cable 48 is attached. The strips 20 are provided with the arms 49 to which are attached cables 50 and 51. The cable 50 is therefore connected with the fixed electrodes of two of the microphones while 51 is connected to fixed electrodes of the opposite two microphones and the cable 48 is the common for the movable electrodes of all the microphones.

The stylus bar 38 is preferably equipped with a bushing 52 tightly fitted therein and reamed to a slight taper corresponding with the pivot 39. It is very important that the bearing of this pivot be free from any lost motion that will result in noise or rattling when the stylus bar vibrates.

The base 10 is preferably fitted with an arched cover 53 secured to the flange 11 by screws 54 or other suitable fastening. This cover preferably carries a fitting 55 having suitable passages for the cables 48, 50 and

51. I prefer to make this cover of perforated metal as indicated, but it may be of any suitable form.

When the stylus bar 38 is vibrated by the stylus 56 running in the groove of a phonograph record, the upper end of the stylus bar will reciprocate the movable electrodes of the microphone and produce alternating electric waves. The magnifying effect of the microphones will cause these waves to be of much greater amplitude than the vibrations of the stylus bar. Consequently they can be used to operate a telephone or other receiver directly. For some purposes, it will be desirable, however, to further amplify these waves which may be done in the manner indicated in my co-pending application, Serial No. 581,572, filed August 14, 1922, or in any other desired way.

The arrangement illustrated shows how a plurality of microphones may be connected to be operated by a single stylus bar and will be sufficient to teach those skilled in the art how to make use of any suitable number that may be required by particular service.

The insulated joints between the posts 16 and the base 10 and between the stylus bar 38 and the connecting bar 35 confine the current to parts lying within the cover 53, so that there is no danger of either fire or shock from the use of the apparatus.

By mounting the microphones in the posts 16, as shown, and securing them in place by screws or other suitable fastening means, the several cups can be readily located and adjusted to operate evenly with the movements of the connecting bar 35. This arrangement also permits the cups to be quickly and easily dismantled for inspection, repair, or replacement of parts.

I am aware that changes may be made in the form, construction and arrangement of the invention, as set forth in the selected embodiment herein, without departing from the scope or sacrificing any of its material advantages, and I therefore reserve the right to make all such changes as fairly fall within the scope of the following claims.

I claim:

1. In a reproducer for phonographs, the combination of a plurality of spaced microphones, a connecting bar between said microphones, a stylus bar extending through said connecting bar and rigidly secured thereto, and means for insulating said stylus bar from said connecting bar.

2. In a reproducer, a pair of microphones spaced apart and facing one another, each microphone comprising a fixed electrode and a movable electrode, the movable electrodes of said microphones being oppositely disposed and substantially parallel and coaxially connected together to operate in unison, slidable mounting means for said microphones, and a stylus bar connected to said movable electrodes.

3. In a reproducer, a pair of microphones facing one another, each microphone comprising a fixed electrode and a movable electrode, the movable electrodes of said microphones being substantially parallel and coaxially connected together to operate in unison, slidable mounting means for said microphones, a stylus bar connected to said movable electrodes, conductors leading from said fixed electrodes, and a common conductor connected to said movable electrodes.

4. In a reproducer, a plurality of pairs of microphones, the microphones in each pair being spaced apart and facing one another and each microphone comprising a fixed electrode and a movable electrode, the movable electrodes in each pair being oppositely disposed and substantially parallel to each other and connected together to operate in unison, a pivotally mounted stylus bar between the microphones, and means connecting said stylus bar to the movable electrodes in each pair.

5. In a reproducer, a plurality of pairs of microphones, the microphones in each pair facing one another and each microphone comprising a fixed electrode and a movable electrode, the movable electrodes in each pair being substantially parallel to each other and connected together to operate in unison, a pivotally mounted stylus bar, means connecting said stylus bar to the movable electrodes in each pair, a pair of conductors, one fixed electrode of each pair of microphones being connected to one of said conductors and the other fixed electrode of each pair being connected to the other of said conductors, and a common conductor connected to all of said movable electrodes.

6. In a reproducer, a pair of posts, a microphone supported on each post, said microphones being spaced apart and facing one another and being substantially parallel to each other, each microphone comprising a fixed electrode and a movable electrode, said movable electrodes being oppositely disposed, intermediate means connecting said movable electrodes, and means for adjusting said microphones in said posts to vary the distance therebetween.

7. In a reproducer, a plurality of pairs of microphones, the microphones in each pair facing one another and each microphone comprising a fixed electrode and a movable electrode, the movable electrodes in each pair being substantially parallel to each other and connected together to operate in unison, a pivotally mounted stylus bar, and means connecting said stylus bar to the movable electrodes in each pair.

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