

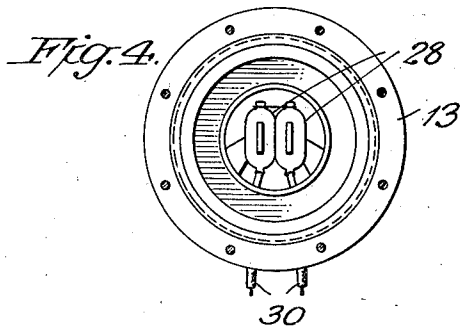
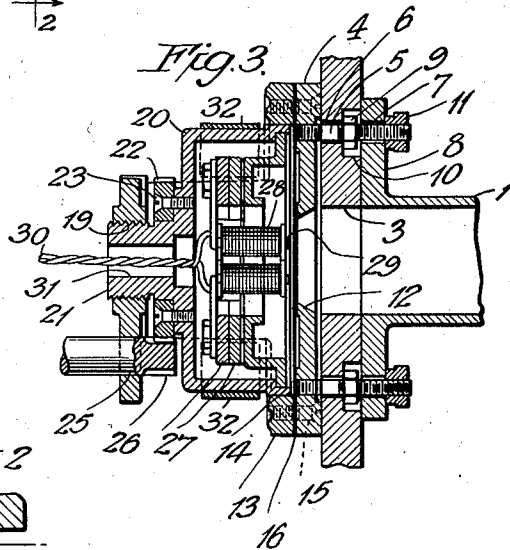
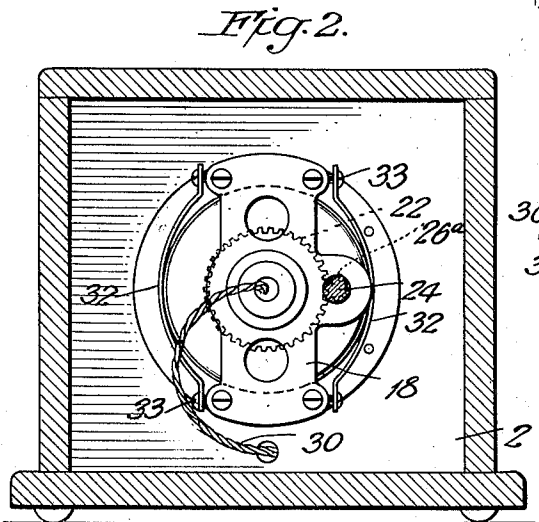
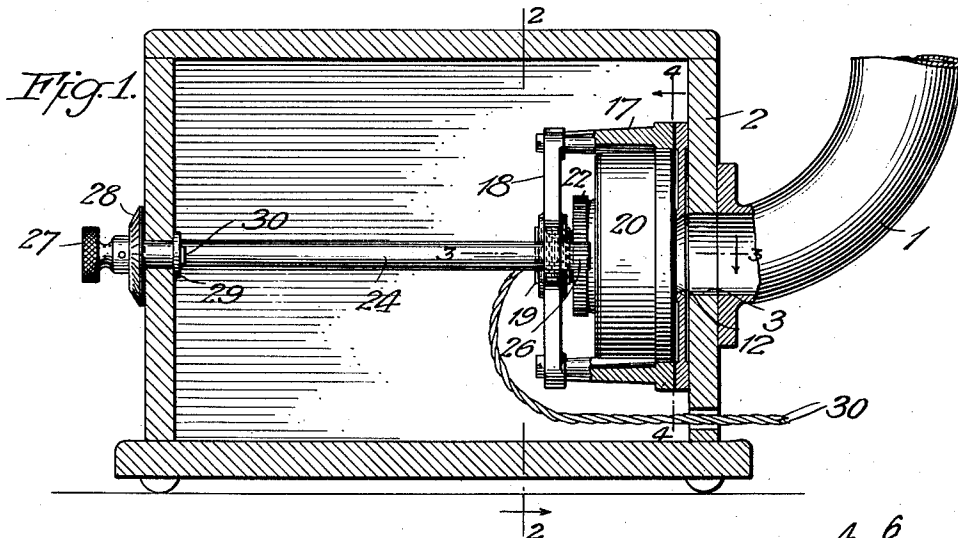
March 22, 1927.

H. KOCH

1,621,845

LOUD SPEAKING TELEPHONE RECEIVER

Filed March 30, 1923



INVENTOR.
HENRY KOCH

BY
Shackelford & Bond
ATTORNEYS.

UNITED STATES PATENT OFFICE.

HENRY KOCH, OF JAMAICA, NEW YORK, ASSIGNOR TO DICTOGRAPH PRODUCTS CORPORATION, A CORPORATION OF VIRGINIA.

LOUD-SPEAKING TELEPHONE RECEIVER.

Application filed March 30, 1923. Serial No. 628,709.

This invention relates to telephone receivers, particularly to the type commonly employed in radio telephone receiving sets and known as loud speakers. In prior instruments of this type the diaphragm, electromagnets, and pole pieces have been fixed relatively to one another, and with any given spacing of the diaphragm and pole pieces the instrument might operate well when connected in one receiving set, and unsatisfactorily when connected in another receiving set or when the voltage and current conditions in the circuit were varied.

An object of the invention is to provide an improved receiver of this type which may be operated successfully and satisfactorily with any receiving set or instrument, or under various conditions of current and voltage, and which is relatively simple in construction and operation, and inexpensive. Other objects and advantages will be apparent from the following description of an embodiment of the invention and the novel features will be particularly pointed out hereinafter in claims.

In the accompanying drawing:

Figure 1 is a sectional elevation of an instrument constructed in accordance with the invention;

Figure 2 is a transverse sectional elevation of the same, taken substantially along the line 2—2 of Fig. 1;

Figure 3 is a sectional plan of the same taken substantially along the line 3—3 of Fig. 1; and

Figure 4 is a transverse sectional elevation of the same, taken substantially along the line 4—4 of Fig. 1.

In the illustrated embodiment of the invention, an amplifying horn 1 is mounted upon one end of a suitable casing 2 so as to communicate at its small end with the interior of the casing through an aperture 3 in one of the casing walls. A disc 4 overlies the aperture 3 and is secured to the inner face of the casing in any suitable manner such as by means of screws 5 which extend from the base of the disc through apertures 6 in the casing and through apertures

7 in the flange 8 provided upon the small or inlet end of the amplifying horn. A nut 9 is threaded upon each screw 5 between the flange 8 and the wall of the casing, being countersunk into a recess 10 in the outer face of the casing so as to allow the flange 8 to abut tightly against the outer surface of the casing. The nut 9 serves to hold the disc 4 to the inner face of the casing before the amplifier is applied to the casing over the projecting ends of the screws 5. Nuts 11 may be threaded upon the extreme projecting ends of the screws 5 so as to clamp the flanged end 8 of the amplifying horn to the casing. The amplifying horn is thus supported firmly at its small end, but obviously may also be supported at other points if desired. The disc 4 is provided with an aperture 12, aligned with the aperture 3 and with the passage at the small end of the amplifying horn.

A frame 13 having an aperture 14 in one face thereof is secured in a suitable manner, such as by screws 15, to the exposed face of the disc 4 so as to clamp between them a suitable diaphragm 16, the diaphragm being clamped around its periphery. The frame is provided with extensions 17 which are connected at their rear ends by a bar 18 extending parallel to the plane of the apertured end of the frame. The bar 18 is provided with an aperture 19 aligned with the aperture 14 of the frame. A barrel 20 is rotatably and slidably mounted in the aperture 14, and carries an axial extension 21 which passes through the aperture 19 of the bar 18 and has threaded engagement therewith, so that when the barrel 20 is rotated it will be given a somewhat axial movement owing to its threaded engagement with the cross bar 18 of the frame. A gear 22 is secured, in any suitable manner such as by screws 23, to the barrel 20.

An actuating shaft 24 is rotatably mounted in an aperture 25 of the cross bar 18, at one side of the aperture 19, and carries pinion or teeth 26 which mesh with the gear teeth of the gear 22, so that when the shaft 24 is rotated in the aperture 25, the pinion

or teeth 26 of the shaft will drive the gear 22 and through it rotate the barrel 20. The barrel 20 in rotating will, as before explained, move slightly in an axial direction 5 because of its connection to the frame. The shaft 24 extends through a wall of the casing and carries at its outer end a suitable operating handle or knob 27 and dial 28 by 10 which the rotation of the shaft may be manually accomplished and the increments of rotation measured. The knob and dial abut against the outer face of the casing and a suitable washer 29 and cotter pin 30 may 15 be provided upon the shaft within the casing so as to abut against the inner face of the wall of the casing through which the shaft passes. The shaft is thus held against endwise displacement but is free to rotate.

One of the teeth 26 of the shaft which is 20 indicated by the reference character 26^a (Fig. 2) is considerably wider than the other teeth and is too wide to pass in the space between the two adjoining teeth of the gear 22, so that whenever this tooth engages with the teeth of the gear 22, further 25 rotation in the same direction will be prevented. This tooth 26^a therefore acts as a limit stop for limiting rotation of the shaft 24 to slightly less than an entire revolution.

30 Suitable telephone receiver mechanism is mounted within the barrel 20 and is operative upon the diaphragm 16. This mechanism comprises permanent magnets 27 and electromagnets 28, the poles 29 of which extend into close proximity to but slightly 35 spaced from the diaphragm 16. As the barrel is given a limited endwise movement, the poles 29 of the electromagnets will be shifted toward or from the diaphragm. Circuit 40 wires 30 connected with the electromagnets are lead through a passage 31 in the extension 21 of the barrel and then are conducted in any suitable manner to the exterior of the casing for connection to an operating circuit. 45

In order to hold the barrel in different angular positions to which it has been rotated, I may secure leaf springs 32 to the 50 extensions 17 by screws 33, so as to extend between the extensions and around and in contact with portions of the periphery of the barrel. By tightening the screws 33 the springs 32 can be carried into closer proximity to the extensions so as to press more 55 firmly against the barrel periphery and thus create a greater frictional resistance to rotation of the barrel. By loosening the screws 33, the frictional resistance to rotation of the barrel may be lessened.

60 In use the device is assembled in the manner indicated, and the wires 30 are connected to a suitable operating circuit such as the plate circuit of a radio telephone receiving apparatus. The knob 27 is then rotated 65 until the maximum loudness and clearness

of sounds coming from the amplifying horn 1 are secured. The rotation of the knob serves to shift the barrel 20 endwise, which carries the poles 29 toward or from the diaphragm to vary their influence thereon. The 70 springs 32 frictionally hold the barrel in the different adjusted positions and the tooth 26^a confines the rotation of the barrel to practical limits. The instrument may thus be adjusted to operate successfully and give 75 maximum loudness and clearness of sounds when connected in any receiving set, and under all conditions of voltage and current which are likely to be encountered in operating circuits. 80

It will be obvious that various changes in the details and arrangements of parts herein described and illustrated for the purpose of explaining the nature of the invention, 85 may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims. —

I claim:

1. A telephone receiver comprising a diaphragm support, a diaphragm mounted therein, an electromagnetic device mounted 90 for rotation relative to said diaphragm support, a screw threaded connection between the diaphragm support and the electromagnetic device whereby upon rotation of the 95 electromagnetic device the diaphragm and said device will be relatively adjusted toward or from each other, axially rotatable actuating means, and gear connections between said means and said electromagnetic device whereby axial rotation of said means effects 100 rotation of the electromagnetic device.

2. A telephone receiver comprising a sound wave amplifier, a frame supported adjacent 105 the inlet end of the amplifier, a diaphragm disposed in a position to set up sound waves in the inlet end of the amplifier, an electromagnetic device rotatably carried by the 110 frame in proximity to the diaphragm to actuate the same, said device having threaded engagement with the frame, whereby as the device is rotated it will be carried bodily toward or from the diaphragm to vary its 115 influence thereon, axially rotatable actuating means, and gear connections between said means and said electromagnetic device whereby axial rotation of said means effects rotation of the electromagnetic device.

3. A telephone receiver comprising a sound wave amplifier, a frame supported adjacent 120 the inlet end of the amplifier, a diaphragm disposed in a position to set up sound waves in the inlet end of the amplifier, an electromagnetic device rotatably carried by the 125 frame in proximity to the diaphragm to actuate the same, said device having threaded engagement with the frame, whereby as the device is rotated it will be carried bodily toward or from the diaphragm to vary its 130 influence thereon, an operating member, and a

geared connection between the member and the electromagnetic device, whereby the electromagnetic device may be rotated to vary the position of the electromagnetic device relatively to the diaphragm.

4. A telephone receiver comprising a sound wave amplifier, a frame supported adjacent the inlet end of the amplifier, a diaphragm disposed in a position to set up sound waves in the inlet end of the amplifier, an electromagnetic device rotatably carried by the frame in proximity to the diaphragm to actuate the same, said device having threaded engagement with the frame, whereby as the device is rotated it will be carried bodily toward or from the diaphragm to vary its influence thereon, a gear member rotatable unitarily with said electromagnetic device with gear teeth extending arcuately about its axis of rotation, and a shaft having on one end an operating button and carrying thereon a gear member meshing with the gear teeth of the other gear member, whereby the electromagnetic device may be rotated to vary the position of the electromagnetic device relative to the diaphragm.

5. A telephone receiver comprising a sound wave amplifier, a frame supported adjacent the inlet end of the amplifier, a diaphragm disposed in a position to set up sound waves in the inlet end of the amplifier, an electromagnetic device rotatably carried by the frame in proximity to the diaphragm to actuate the same, said device having threaded engagement with the frame, whereby as the device is rotated it will be carried bodily toward or from the diaphragm to vary its influence thereon, a gear member on said electromagnetic device with gear teeth extending arcuately about its axis of rotation, and a shaft having on one end an operating button and carrying thereon a gear member meshing with the gear teeth of the other gear member, whereby the position of the electromagnetic device relatively to the diaphragm may be varied by operation of the button, one of the gear members having a tooth of greater width than the distance between two teeth whereby when it is engaged by the teeth of the other gear member it acts as a limit stop to limit the adjustment of the electromagnetic device.

6. A telephone receiver comprising two relatively rotatable parts, one of said parts comprising a diaphragm support and a diaphragm mounted therein and the other of said parts comprising an electromagnetic device for actuating the diaphragm, a screw threaded connection between said parts whereby upon relative rotation between the parts the electromagnetic device and diaphragm support may be adjusted relatively toward or from each other, axially rotatable actuating means, and gear connections whereby axial rotation of said means rotates

one of said parts and effects adjustment of the diaphragm and electromagnetic device toward or from each other.

7. A telephone receiver comprising two relatively rotatable parts, one of said parts comprising a diaphragm support and a diaphragm mounted therein and the other of said parts comprising an electromagnetic device for actuating the diaphragm, a screw threaded connection between said parts whereby upon relative rotation between the parts the electromagnetic device and diaphragm support may be adjusted relatively toward or from each other, axially rotatable actuating means, and gearing connections whereby axial rotation of said means rotates one of said parts and effects adjustment of the diaphragm and electromagnetic device toward or from each other.

8. The receiver substantially as set forth in claim 7 in which one of the members of the gearing connection has a tooth of greater width than the others to act as a limit stop when it engages the other member of the connection.

9. A telephone receiver, a sound wave amplifier, a diaphragm disposed in a position to set up sound waves in the inlet end of the amplifier, a support for the diaphragm, an electromagnetic device operative upon the diaphragm to actuate the same and having a screw-threaded connection with the support whereby upon relative rotary movement the device and diaphragm may be adjusted relatively toward and from one another, means for producing such relative rotary movement, and a spring friction element carried by one of the relatively rotating parts and engaging with the other whereby these parts will be frictionally held in different relative positions.

10. A telephone receiver, a sound wave amplifier, a diaphragm disposed in a position to set up sound waves in the inlet end of the amplifier, a support for the diaphragm, an electromagnetic device operative upon the diaphragm to actuate the same and having a screw-threaded connection with the support whereby upon relative rotary movement the device and diaphragm may be adjusted relatively toward and from one another, means for producing such relative rotary movement, and a spring friction element adjustably carried by one of the relatively rotating parts and engaging with the other whereby these parts will be frictionally held in different relative positions.

11. A telephone receiver, a sound wave amplifier, a diaphragm disposed in a position to set up sound waves in the inlet end of the amplifier, a support for the diaphragm, an electromagnetic device operative upon the diaphragm to actuate the same and having a screw-threaded connection with the support whereby upon relative rotary move-

ment the device and diaphragm may be adjusted relatively toward and from one another, means for producing such relative rotary movement, a leaf spring bridged across
5 spaced points on the diaphragm support and in frictional contact with the electromagnetic device, and means for securing the spring to the support and capable of adjustment to vary the pressure of the spring on the device, whereby the relatively rotating parts 10 will be frictionally held in different relative positions.

In witness whereof, I hereunto subscribe my signature.

HENRY KOCH.