Feb. 28, 1928. 1,661,082

E. J. NIELSEN

RECEIVER

Filed Feb. 20, 1925

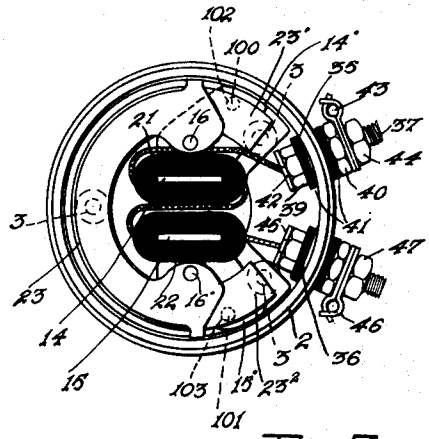

Fig. 3.

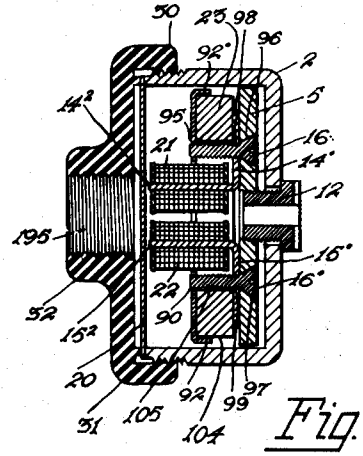

Fig. 4.

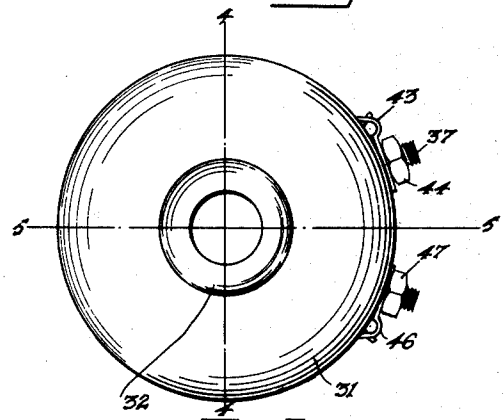

Fig. 1.

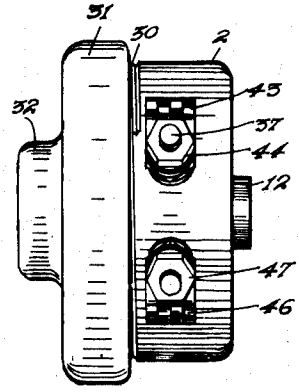

Fig. 2.

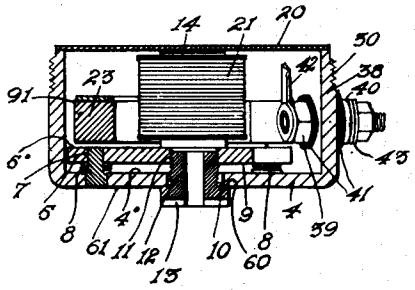

Fig. 5.

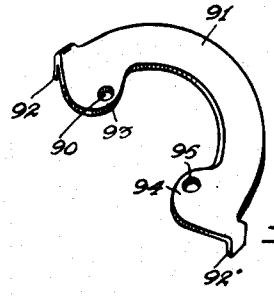

Fig. 6.

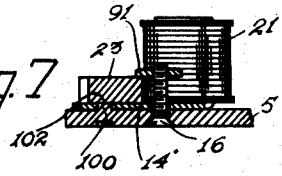

Fig. 7

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Patented Feb. 28, 1928. 1,661,082

UNITED STATES PATENT OFFICE.

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RECEIVER.

Application filed February 20, 1925. Serial No. 10,481.

My invention relates to receivers and has to do more particularly with loud speaker units as they are commonly known in the radio art. An object of my invention is the provision of a receiver or reproducer, of this type, that is provided with novel features of construction and assembly of parts to produce a receiver most efficient in its operation.

A feature of my invention is the provision of supporting means for the pole pieces and associated apparatus which are supported, as a whole, on springs; and I provide adjustable means, associated with this supporting means for moving the supporting means, as a whole, up or down, in its enclosing cup to vary the air gap between the pole pieces and the diaphragm to obtain the maximum efficiency for a clear and perfect reception of sound.

Another feature of my invention is a new and novel clamping arrangement for securing the permanent magnet and pole pieces to a supporting disk to form a unit structure. The clamping means is in the form of a clamping plate and in association with a pair of screws secures the pole pieces and permanent magnet in position against movement relative to each other and to the disk upon which they are supported. This clamping means provides means for the easy assembly of the parts to form the operating unit of the receiver and reduces the machining of parts to a minimum thereby greatly decreasing the cost of manufacture. Heretofore it has been necessary to machine the permanent magnets to provide means for securing them to their supporting means. This operation has been tedious and costly due to the hardness, etc., of the magnet steel. My method of construction entirely obviates the necessity of machining the permanent magnets.

The above features, as well as others, not specifically pointed out, will be more fully described in the ensuing specification and in the appended claims.

For a more complete understanding of my invention reference may be had to the accompanying drawing in which like reference characters in the several views denote like parts and in which:

Fig. 1 is a plan view of the receiver of my invention;

Fig. 2 is a right side view of Fig. 1;

Fig. 3 is a plan view of the receiver with the cap and diaphragm removed to clearly illustrate the interior apparatus;

Fig. 4 is a sectional view along the line 4—4 of Fig. 1;

Fig. 5 is a sectional view along the line 5—5 of Fig. 1;

Fig. 6 is a perspective view of the clamping member, and

Fig. 7 is a sectional view illustrating the method of securing the pole pieces of the receiver in position against movement relative to the supporting plate.

Referring now more in detail to the receiver of my invention it comprises a cup-shaped member 2, formed of suitable material such as brass, in which I adjustably secure the mechanism of the receiver. Three pins 3 spaced equally apart are secured to the base 4 of the cup member 2 and project up from the face 4′ of the base 4 into the interior of the cup member 2. A disk 5, of any suitable matter such as brass, is provided with three orifices 7 which are in alignment with the three pins 3 which extend up into these orifices 7 when the disk 5 is placed in position. A helical spring 8 is placed around each pin 3 and rests between face 4′ of the base 4 of the cup member 2 and the bottom face 9 of the disk 5 for purposes as will be presently described. The base 4 of the cup member 2 is provided with a central orifice 10 and the disk 5, which rests upon the helical springs 8, is provided with a tapped orifice 11, in alignment with the central orifice 10 in the base 4 of the cup member 2. A threaded stud 12, provided with a slotted head 13, passes through the orifice 10 in the base 4 of the cup member 2 and has screw-threaded engagement with the tapped orifice 11 in the disk 5 for purposes as will be described presently.

A semi-circular shaped permanent magnet 23 constructed of steel or other suitable material which is permanently magnetized is placed in the cup member 2. The said magnet 23 fits along the inner periphery of the cup member 2 with its ends, 23′ and 23²,

terminating over the portions 14′ and 15′ of the angularly shaped pole pieces 14 and 15 and these portions rest between the top face 5′ of the disk 5 and the permanent magnet 23. The angularly shaped pole pieces 14 and 15 have portions 14^2 and 15^2 which extend upward in proximity to a diaphragm 20, and carry the magnet coils or spools 21 and 22.

To secure the pole pieces 14 and 15 and the permanent magnet 23 in position on the disk against movement relative to each other and the disk 5 I provide a semi-circular shaped clamping member 91 of substantially the same contour as that of the permanent magnet 23. The clamping member 91 rests upon the permanent magnet 23 and is provided with a pair of diametrically opposite projecting ears 93 and 94 which are provided with tapped orifices 90 and 95 for purposes as will presently be described. Suitable aligned orifices 96 and 97 are provided in the disk 5, and orifices 98 and 99, in the portions 14′ and 15′ of the pole pieces 14 and 15 are also provided. Clamping screws 16 and 16′ are provided and extend through these aligned orifices 96—98 and 97—99 and have screw threaded engagement with the aligned tapped orifices 95 and 90 in the clamping member 91. The clamping screws when tightened, clamp the permanent magnet 23 and pole pieces 14 and 15 in position on the disk 5. A pair of protruding studs or pins 100 and 101 are formed on the face 5′ of the disk 5 by means of a suitable punch and die in which the punch forces a portion of the metal into the die opening a predetermined distance, this, of course, depending upon the height of the pins to be formed and is known in the art as a slugging operation, and the metal which is forced into the die opening to form the studs 100 and 101 is not severed completely and still remains an integral part of the disk 5. The pins 100 and 101 extend into suitable orifices 102 and 103 in the portions 14′ and 15′ of the pole pieces 14 and 15 and serve to prevent rotation of the pole pieces about the clamping screws 16 and 16′. The clamping member 91 is provided with a pair of depending members 92 and 92′ which rest against the peripheral face 104 of the permanent magnet 23. The depending members 92 and 92′ in combination with the clamping screws 16 and 16′, the bodies of which rest against the inner peripheral face 105 of the magnet 23, prevent lateral movement of the permanent magnet relative to the pole pieces 14 and 15.

From the above description it is readily apparent the operating unit of the receiver of my invention may be assembled as a separate unit comprising the supporting disk 5 and the pole pieces 14 and 15 and their spools 21 and 22 and the permanent magnet 23, and by means of the clamping member 91 and the two clamping screws 16 and 16′ the parts are secured to the disk 5 against movement, thus providing a simple and cheap method of assembly.

The cup member 2 is provided with external threads 30 at its forward end upon which is screwed a cap 31, which is made of suitable material such as hard rubber or bakelite. The cap 31 is provided with an integrally formed member 32 which is provided with an internal thread 195 and is adapted to receive a suitable sleeve member for connecting it as a unit to a projector or horn.

A pair of binding posts or terminals 35 and 36 are secured to the cup member 2 and as both are alike a detailed description of one will suffice. The terminal 35 comprises a stud 37 which passes through a suitable insulating sleeve which extends through a suitable orifice in the side wall 38 of the cup member 2. Nuts 39 and 40 are provided and have screw-threaded engagement with the protruding ends of the stud 37 and clamp the same in position against rotation. Suitable insulating washers 41 are placed between the nuts 39 and 40 to insulate them from the cup member 2. A suitable terminal 42 is also secured to the stud 37 in any suitable manner and the terminal end of the winding of the magnet coil 21 is soldered thereto. A suitably formed clip 43 is clamped in position on the stud 37 by a nut 44 and this clip 43 is adapted to receive the external cord terminal connection. The terminal 45 is also provided with terminal 36 to which is soldered the terminal end of the magnet coil 22, and a clip 46 secured to the terminal 36 by means of a nut 47 is adapted to receive the other external cord terminal.

Having described in detail the apparatus of the receiver of my invention I will now describe how the disk 5 and its supported apparatus is adjustably secured as a whole in the cup member 2.

The disk 5 and its supported apparatus may be adjusted as a whole up or down relative to the clamped diaphram 20 to change the air gap between the diaphragm 20 and the pole pieces 14 and 15. When the stud 12 is turned in a clockwise direction, through the agency of a suitable tool placed in the slot of the head 13 of the stud 12, this turning of the stud 12 in a clockwise direction permits the helical springs 8, around the pins 3, and between the face 4′ of the base 4 and the face 9 of the disk 5, to force the disk 5 and its supported pole pieces, 14 and 15, closer to the diaphragm 20, which is clamped in position by the cap 31. The disk 5 in its upward movement, which is caused by the springs 8, is guided by the pins 3 which extend upward into the aligned

orifices 7 in the disk 5. The pins 3, in addition to serving as means for guiding this upward movement of the disk 5 and its supported pole pieces 14 and 15 as a whole, prevent the disk 5 from tilting in its movement and also prevent the disk 5 from turning when the adjusting stud 12 is turned, To move the disk 5 and its supported parts down, to widen the air gap between the pole pieces 14 and 15 and the diaphragm 20, the stud 12 is turned in a counter-clockwise direction and this rotation of the stud 12 draws the disk 5, and its associated parts, down against the tension of the helical springs 8 which are thus placed under compression due to the connection between the stud 12 and the disk 5. The tension on the springs 8 tends to force the disk 5, and its associated parts, up thus causing the face 60 of the head 13 of the stud 12 to engage face 61 of the cup member 2. The friction between the faces 60 and 61 is sufficient to hold the stud 12 against movement after the air gap between the pole pieces 14 and 15 and the diaphragm 20 has been set. The disk 5, and its associated parts, is floated upon the springs 8 and the tension of the springs 8 in combination with the guide pins 3 permits vertical movement of the disk 5.

While I have illustrated and described a preferred embodiment of my invention, it is to be understood, that changes and modifications will readily suggest themselves to those skilled in the art, and I, therefore aim to cover all such changes as come within the spirit and scope of the appended claims.

Having described my invention what I claim as new and desire to secure by United States Letters Patent is:

1. A device of the character described including a cup member, a disk, a pair of pole pieces, a magnet, said pole pieces and said magnet being supported on said disk, means including a semicircular member and pins integrally formed with said disk for securing said pole pieces and said magnet on the said disk, and adjusting means associated with said disk for adjusting said disk, said pole pieces, and said magnet, as a unit, up or down in said cup member.

2. A device of the character described including a disk, a pair of pole pieces supporting magnet coils, a magnet, and means including pins integrally formed with said disk, and cooperating with orifices in the said pole pieces, to position and support said pole pieces.

3. A device of the character described including a disk, a pair of pole pieces and a permanent magnet supported on said disk, a clamping member resting on said permanent magnet, and means including said clamping member, a pair of clamping screws, and pins integrally formed with said disk for clamping said pole pieces and said permanent magnet to said disk.

4. A device of the character described including a supporting disk, a pair of pole pieces resting on said disk, a permanent magnet associated with said pole pieces, a semi-circular clamping member and pins integrally formed with said disk resting on said permanent magnet, clamping screws for said clamping member for securing said pole pieces and said permanent magnet on said supporting disk.

5. A device of the character described including a supporting disk, a pair of pole pieces and a circularly shaped clamping member resting on said magnet, aligned orifices in said disk and said pole pieces, clamping screws extending through said orifices for engagement with said clamping member to clamp said pole pieces and said permanent magnet to said disk, and pins integrally formed with said disk cooperating with orifices in said pole pieces to position said pole pieces against movement.

6. A device of the character described including a supporting disk, a pair of pole pieces, a pair of pins integrally formed with said disk for maintaining the said pole pieces in position, a circularly shaped permanent magnet, a semi-circularly shaped clamping member resting on said magnet, aligned orifices in said disk and said pole pieces, clamping screws extending through said orifices for threaded engagement with said clamping member to clamp said pole pieces and said magnet to said disk, and depending members on said clamping member engaging the outer peripheral side of said magnet while said screws engage said inner peripheral face of said magnet to prevent lateral movement of said magnet.

7. A device of the character described including a pair of pole pieces and a circularly shaped permanent magnet, a disk for supporting said pole pieces and said permanent magnet, a semi-circular clamping member, and means including said clamping member for securing said pole pieces and said magnet to said disk, pins integrally formed with said disk cooperating with orifices in said pole pieces for positioning said pole pieces on said disk, and a depending member on said clamping member engaging said magnet, said means and said depending members preventing lateral movement of said magnet.

Signed by me at Chicago, in the county of Cook, and State of Illinois, this 18 day of February, 1925.

EMIL J. NIELSEN.