June 5, 1934. G. S. HOLLY 1,961,665

ELECTRIC SOUND REPRODUCING APPARATUS

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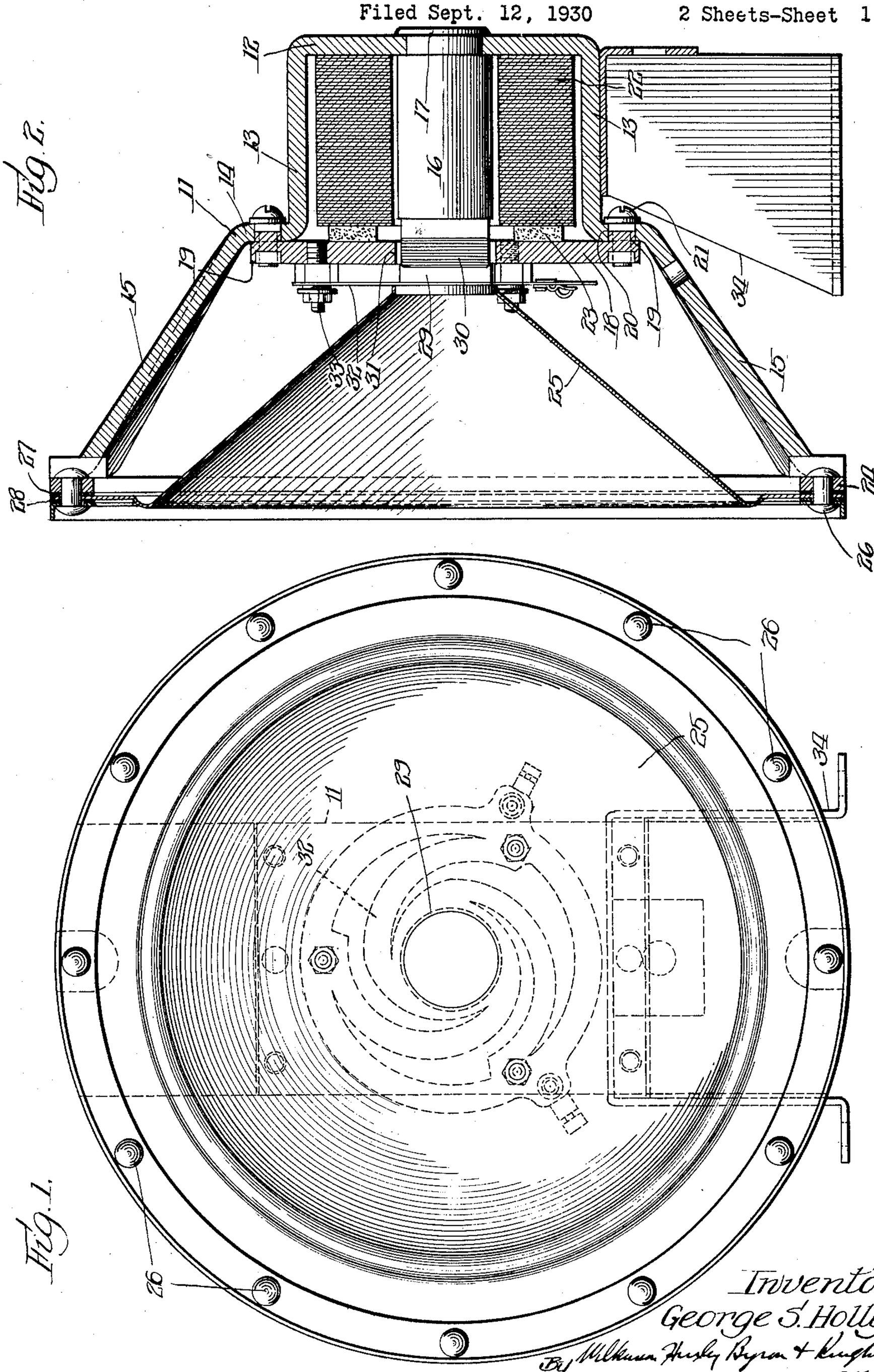

Fig. 2.

Fig. 1.

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Fig. 4.

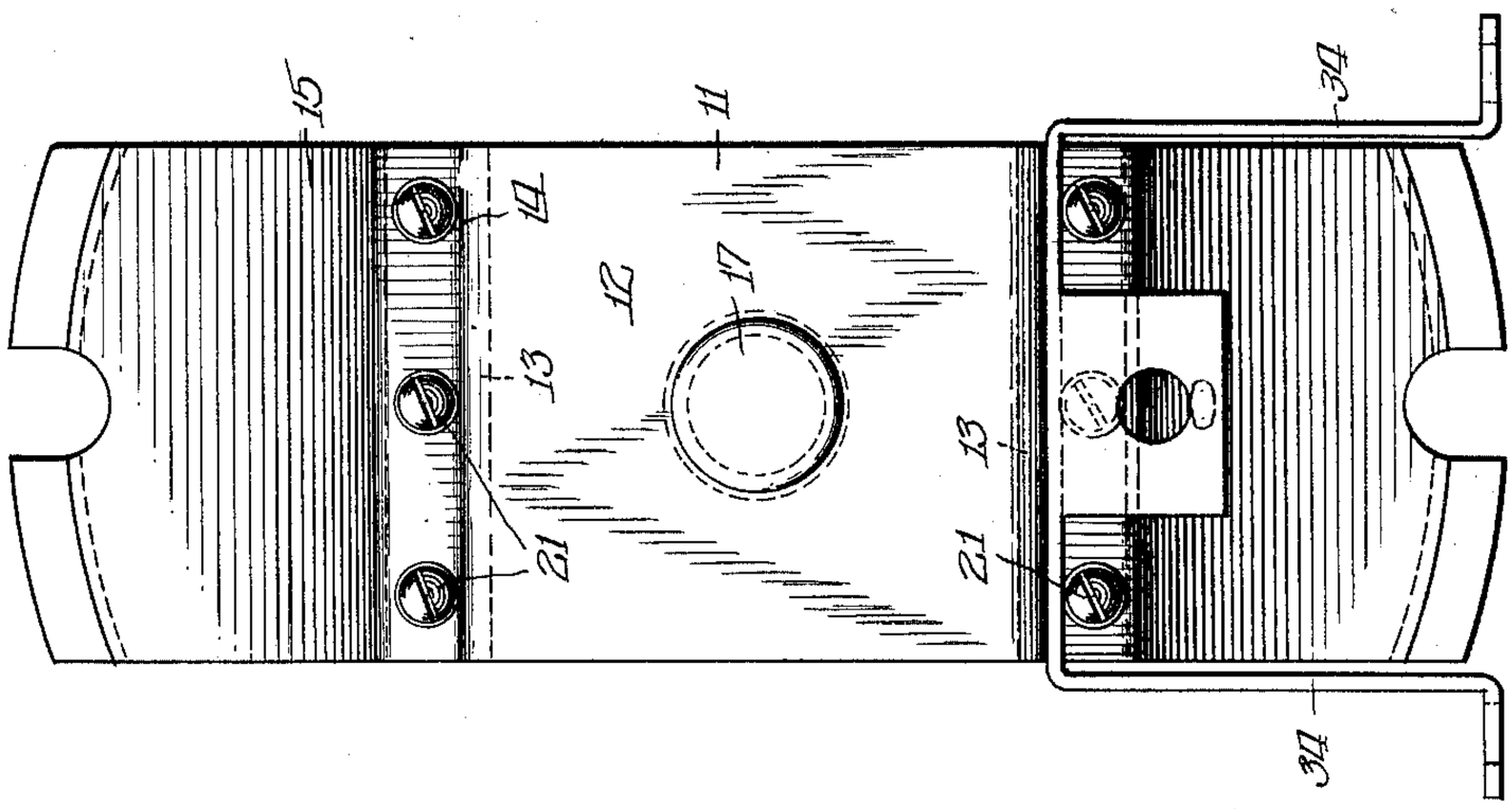
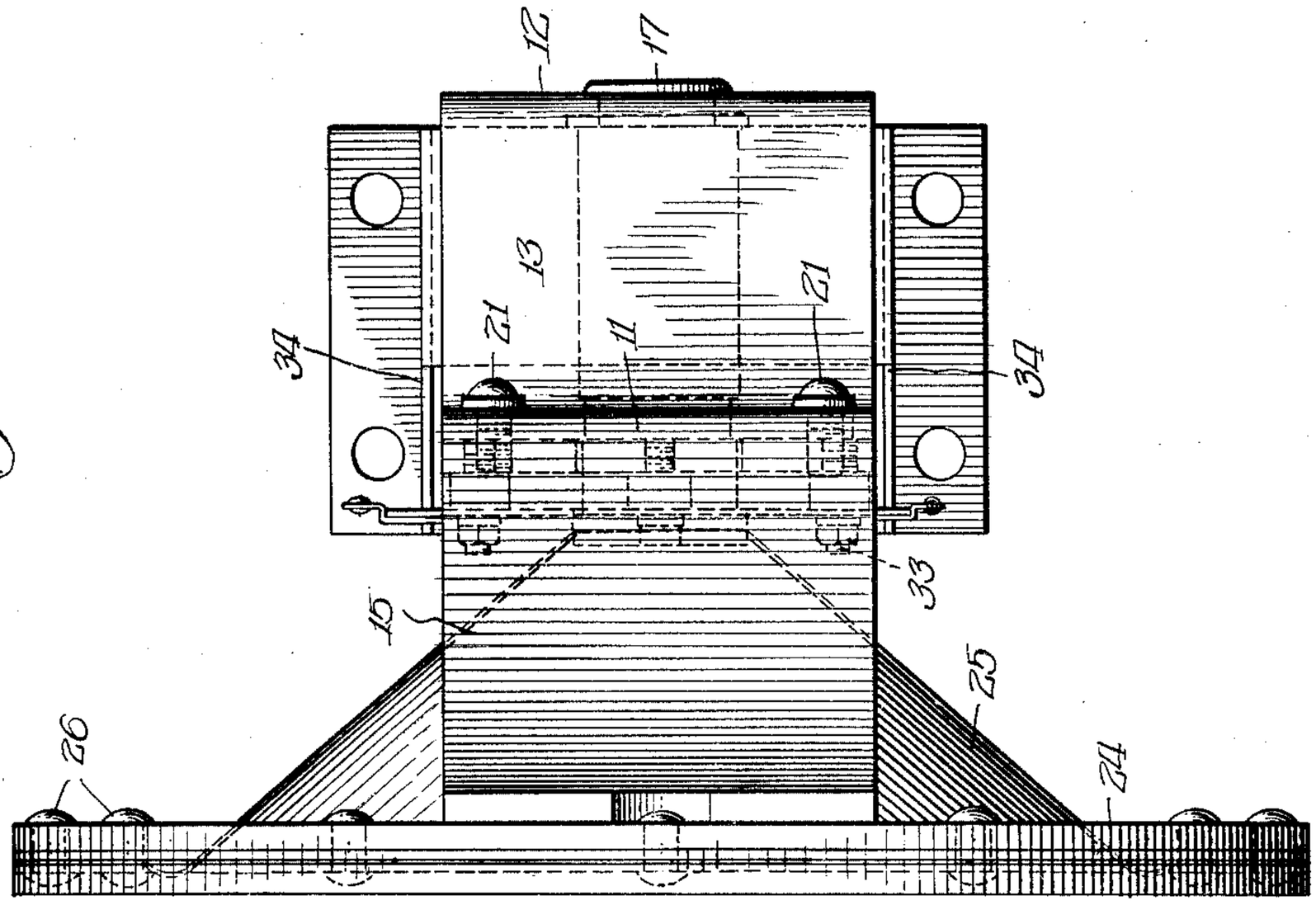


Fig. 3.



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Patented June 5, 1934

1,961,665

UNITED STATES PATENT OFFICE

1,961,665

ELECTRIC SOUND REPRODUCING APPARATUS

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Application September 12, 1930, Serial No. 481,367

4 Claims. (Cl. 179—115.5)

This invention relates to a new and improved construction for electric sound reproducing apparatus, and more particularly to the construction of what is commonly called a dynamic loud speaker, having a movable voice coil carried by the diaphragm.

It is an object of the present invention to provide a reproducer construction in which the diaphragm is supported directly from the operating structure.

It is a further object to provide a construction in which the axial pole is rigidly and permanently located with regard to the shell and circumferential pole piece.

It is also an object to provide a construction in which the axial pole and circumferential pole piece are maintained in registration by means integral with these pieces.

It is also an object to provide a construction which is composed of but few and simple parts and adapted for commercial production.

Other and further objects will appear as the description proceeds.

I have shown a preferred form of my invention in the accompanying drawings, in which—

Figure 1 is a front view of the assembled reproducer;

Figure 2 is a cross section taken on the vertical diameter of the reproducer;

Figure 3 is a plan view of the reproducer; and

Figure 4 is a face view of the pole and shell assembly.

In the drawings, the shell piece 11 is provided with the flat base portion 12, the parallel portions 13, the outturned shoulders 14, which are substantially parallel to the base 12, and with the outwardly flared portions 15. The axial pole piece 16 is riveted to the center of the shell piece at 17. The circumferential pole piece, or field plate, 18, is provided with the integral studs or dowels 19, which fit into corresponding holes 20 in the shoulders 14 of the shell piece. The screws 21 pass through the dowels 19 and secure the circumferential pole piece rigidly to the shell piece. The magnetizing coil 22 surrounds the axial pole piece 16, within the parallel portions 13 of the shell piece. A washer 23, which may be of cardboard, felt, or other material, is placed between the magnetizing coil 22 and the field plate 18 to hold the coil against movement.

The ring 24 is welded to the outer edges of the flaring portions 15 of the shell piece. The diaphragm 25 is secured to the ring 24 by means of rivets 26, the diaphragm being secured between gaskets 27 which are held in place by the clamping ring 28. The diaphragm 25 is conical in form and provided with a cylindrical extension 29 which carries the voice coil 30. This voice coil is located in the circular gap between the axial pole piece 16 and the circular opening 31 in the circumferential pole piece 18. The cylindrical portion 29 and the voice coil are also maintained in position by a spider 32 which is supported from the field plate or circumferential pole piece 18, by a plurality of studs 33. The entire assembly is shown as supported by a metal supporting member 34 which may be welded or otherwise secured to the lower face of the shell piece 11.

In assembling the speaker, the shell piece is formed from a flat strip of suitable magnetizable metal, and the openings 20 are punched or drilled therein. The axial pole piece 16 is riveted in place in the base of the shell piece. The shell piece with the pole piece thereon is then located in jigs by means of the holes 20, and a cut is taken on the outer end of the pole piece to make it perfectly cylindrical and properly centered with regard to the openings 20. The circumferential pole piece or field plate 18 is similarly placed in jigs, being located by the integral studs or dowels 19, and a finishing cut is taken in the central opening 31. The field plate 18 is then assembled on the shell by fitting the dowels 19 into the holes 20. This assures a perfect registration of the hole 31 and pole piece 16, so that the end of the cylindrical pole piece and the circular opening 31 are absolutely concentric.

Since the center of the axial pole piece is permanently riveted to the shell and the shell is formed of heavy rigid material, this alignment will be maintained and it is unnecessary to provide any of the spacing elements which have been used in various prior constructions. The fact that the diaphragm is also directly secured to rigid extensions of the shell assures that they will be perfectly centered. They will be maintained in the proper position by the spider 32. As clearly shown in the drawings, the shell piece is merely a metal strip so that the diaphragm supporting ring 24 is only supported at two points. The sides of the diaphragm are entirely unenclosed and the diaphragm is permitted to vibrate freely without any air cushioning effect due to an enclosing support.

While I have shown one preferred embodiment of my invention, it is capable of change and modification to meet varying conditions, and I contemplate such changes and modifications as come within the spirit and scope of the appended claims.

I claim:

1. In an electric sound reproducing construction, a shell piece having a base portion, spaced parallel portions and shoulders parallel to the base portion, an axial pole piece permanently secured to the base portion between the parallel portions of the shell piece, a circumferential pole piece secured to the shell piece and having an opening surrounding the outer portion of the axial pole piece, the circumferential pole piece fitting against the shoulders of the shell piece, means integral with the shell piece and circumferential pole piece for positively maintaining said parts in registration, the shell piece having flaring end portions beyond the shoulders, a diaphragm supported from the end portions, and a voice coil carried by the diaphragm between the axial pole piece and circumferential pole piece.

2. In an electric sound reproducing construction, a shell piece having a base portion, spaced parallel portions and shoulders parallel to the base portion, an axial pole piece permanently secured to the base portion between the parallel portions of the shell piece, a circumferential pole piece secured to the shell piece and having an opening surrounding the outer portion of the axial pole piece, the circumferential pole piece fitting against the shoulders of the shell piece, means integral with the shell piece and circumferential pole piece for positively maintaining said parts in registration, the shell piece having flaring end portions beyond the shoulders, a diaphragm supported from the end portions, a voice coil carried by the diaphragm between the axial pole piece and circumferential pole piece, and a spider for locating the voice coil, said spider being supported from the circumferential pole piece.

3. In an electric sound reproducing construction, a shell piece consisting of a flat strip of metal bent to form a flat base portion with opposite ends bent upwardly at substantially right angles to the base portion and then bent outwardly to form shoulders parallel to the base portion, a cylindrical axial pole piece permanently secured to the center of the base portion and extending between and parallel to the bent up portions of the shell piece, a circumferential pole piece seated on the flat shoulders of the shell piece, said members being provided with interfitting dowels and recesses whereby the parts are maintained in registration, the opposite ends of the shell piece beyond the shoulders being flared outwardly, and a diaphragm supported from said ends.

4. In an electric sound reproducing construction, a shell piece having a base portion, spaced parallel portions and shoulders parallel to the base portion, an axial pole piece permanently secured to the base portion between the parallel portions of the shell piece, a circumferential pole piece secured to the shell piece and having an opening surrounding the outer portion of the axial pole piece, the circumferential pole piece fitting against the shoulders of the shell piece, the shell piece having outwardly extending end portions beyond the shoulders, a diaphragm supported from the end portions, and a voice coil carried by the diaphragm between the axial pole piece and the circumferential pole piece.

GEORGE S. HOLLY.