April 7, 1942. E. T. TURNEY 2,278,598

SOUND REPRODUCER

Filed Sept. 6, 1940

Fig. 1

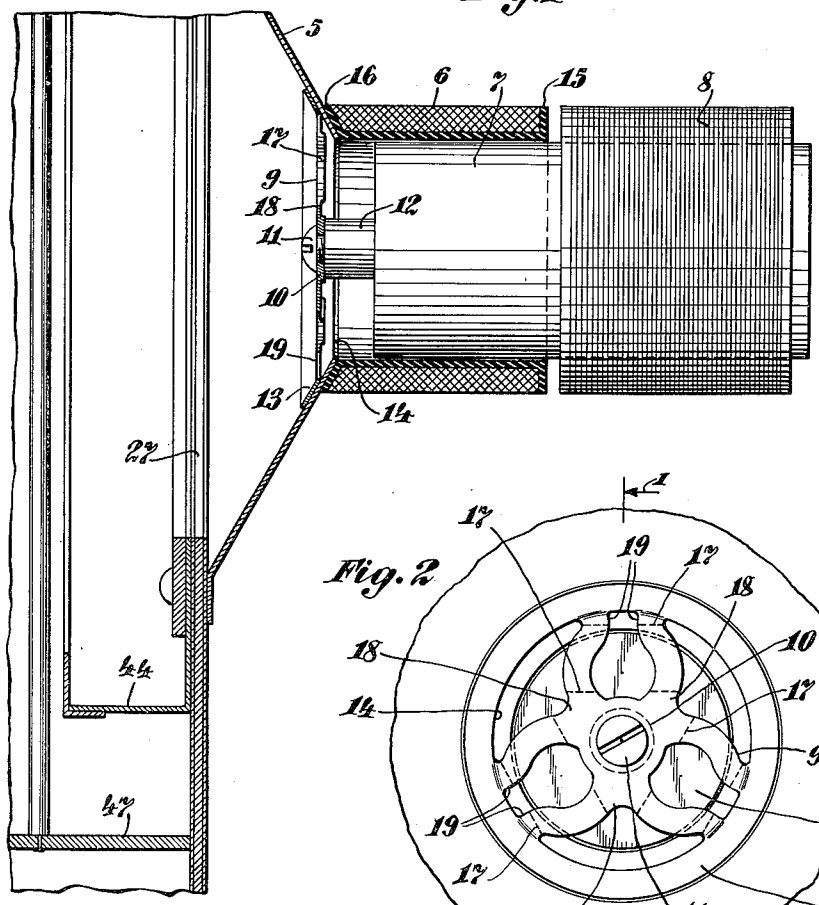
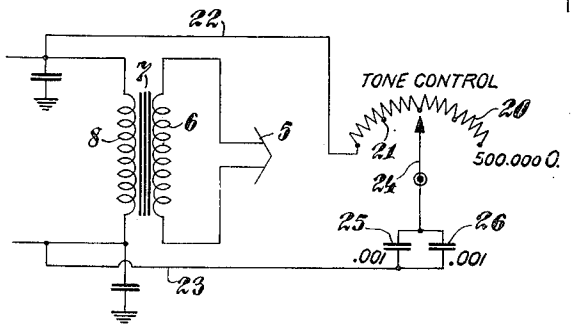


Fig. 2

Fig. 3



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SOUND REPRODUCER

Eugene T. Turney, Holmes, N. Y., assignor of five per cent to James B. Stuart, Hollywood, Calif.; five per cent to B. C. Fields, nine and three-hundred-seventy-five thousandths per cent to William T. Orr, and twenty-eight and one-hundred-twenty-five thousandths per cent to Gladys Orr Hall, all of Los Angeles, Calif.

Application September 6, 1940, Serial No. 355,583

3 Claims. (Cl. 179—115.5)

The present invention relates to reproduction of sound and is a continuation in part of patent application, Serial No. 322,287, Patent No. 2,220,305 issued Nov. 5, 1940.

Objects of the invention are to effect reproduction of sound with full preservation of the original tone qualities and with preservation of the finer, lighter tones, as well as the heavier deeper sounds, in their original values and to accomplish these and other desirable results in a fully practical, simple and inexpensive form of apparatus.

The novel features of the invention through which all such objects are attained are hereinafter described, illustrated by way of example in the accompanying drawing and broadly covered in the claims annexed.

Figure 1 is a broken part sectional view illustrating an embodiment of the speaker mechanism, the sectional portion appearing as on substantially the plane of line 1—1 of Figure 2.

Figure 2 is a broken front view of the speaker unit.

Figure 3 is a wiring diagram illustrating the bridge of excess capacity in the special tone control circuit about the speaker coil.

In the several views the cone or sound wave generating element is indicated at 5, carrying the voice coil 6, operating over the core 7, under the influence of the primary winding 8.

To provide desirable damping effects and at the same time to give the cone certain degrees of flexibility for enabling it to respond properly to the lighter as well as to heavier impulses, the cone and voice coil are supported by a spider of novel construction, involving arms 9 radiating from a central hub 10 secured by screw 11 to the end of a rigid stud 12 projecting from the end of the core.

At their outer ends the spider arms are flexibly connected with a conical ring 13 attached to the inner face of the cone adjacent the central opening 14 therethrough. The spool 15 which carries the voice coil has a correspondingly conical end 16 affixed to the outer face of the cone immediately adjoining the central opening and slightly overlapping the position of the ring 13 at the inside of the cone.

The hub portion 10, as particularly shown in Figure 1, is relatively heavy and rigidly held by the screw to the end of the core stem 12. Similarly, the intermediate portions of the arms at 17 are relatively heavy and rigid, but at opposite ends of such intermediate rigid portions, the arms are thinned down or reduced in thickness as at 18, 19. It appears that under the impulses of the heavier musical notes, the reduced or lighter inner ends 18 of the cone supporting arms will yield and that the lightened connecting portions 19 at the outer ends of the arms may flex with the impulses of the lighter tones, thus to introduce a certain amount of damping, and furthermore, to create what might be considered a certain natural breathing effect, causing at times a seeming continuance of sounds.

Between the reduced or flexible connecting portions at their opposite ends, the arms are indicated as curved, thus to provide additional length, for leverage purposes. Also, the inner ends of the arms are offset out of true radial relation to the supporting center, providing additional length within the relatively small diameter available.

In connection with the fidelity of reproduction attained by the special spider construction described, a certain pleasing and more natural, mellow tone is attained by bridging an excess amount of capacity about the thus constructed cone. This feature is illustrated in Figure 3 where it will be seen that a resistance, 20 in this example, of 500,000 ohms, provided with desired tone control contacts 21, is bridged about the primary 8 of the output transformer by connections 22 and 23 and including adjustable control arm 24 for engagement with points 21 and connected in circuit through parallel capacities 25, 26 having a value in this instance each of .001. This excess capacity, double the amount in this instance, of capacity heretofore employed in standard tone controls, in conjunction with the special speaker unit structure, provides a high degree of fidelity and elimination of undesirable and more or less disturbing frequencies. It is found that with this combination the lighter, more delicate passages of music are reproduced as well as the thunderous, dynamic, heavier passages and with a degree of selectivity enabling, for example, all the instruments in an orchestra to be heard as they individually sound in the original production.

The invention is useful for phonographic, radio and television purposes, speaker systems, voice amplification and the like.

The invention usually may be associated with and form part of a radio receiving set. Thus in the wiring diagram, Figure 3, the transformer at 6, 7, 8, may be considered as the output transformer of a standard radio receiving unit. The speaker cone may be connected to the back of a soundboard over a sound opening through such board, as indicated at 27, and which board may

carry an open sound box 44 at the front about said sound opening and an open tone chamber 47 about the sound box, as disclosed in the application from which the present invention was divided.

What is claimed is:

1. A sound reproducer, comprising a soundboard having a sound opening therein, a cone secured over said opening, a ring secured to the inner portion of said cone, a field core, a voice coil carried by the cone, in cooperative relation with said field core and a spider having a relatively thick hub portion secured to said field core and curved radiating arms with relatively thick intermediate portions and relatively thin end portions, said relatively thin end portions of said arms being connected respectively with said relatively thick hub portion and with said ring.

2. A sound reproducer, comprising a sound wave radiating element, a voice coil carried thereby, a ring carried by said element, a core associated with said voice coil and a spider having a hub portion secured to said core and having curved radiating arms with relatively thick intermediate portions and relatively thin end portions, said relatively thin end portions being connected with said hub portion and with said ring.

3. A sound reproducer, comprising a sound wave radiating element, a voice coil carried thereby, a ring carried by said element, a core associated with said voice coil and a spider having a hub portion secured to said core and having radiating arms with relatively thick intermediate portions and relatively thin end portions, said relatively thin end portions being connected with said hub portion and with said ring.

EUGENE T. TURNEY.