Dec. 20, 1927.

1,653,045

E. F. HOLINGER

LOUD SPEAKER UNIT

Filed Sept. 4, 1926

FIG. 1.

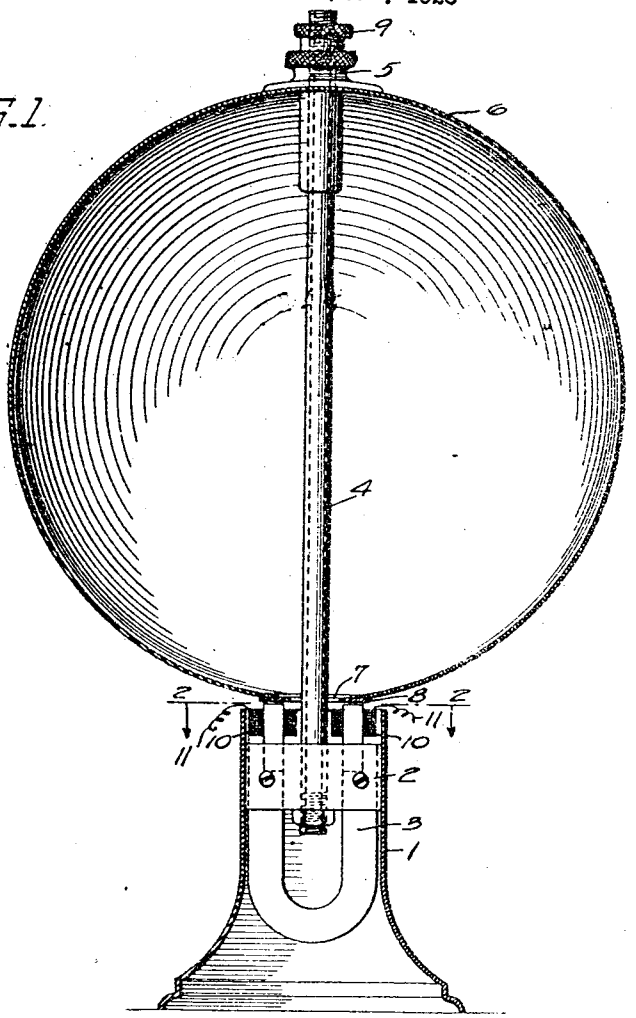
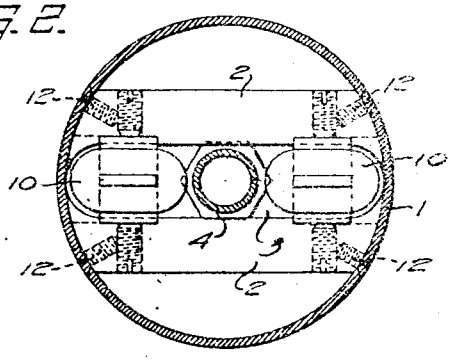



FIG. 2.

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Patented Dec. 20, 1927. 1,653,045

# UNITED STATES PATENT OFFICE.

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## LOUD-SPEAKER UNIT.

Application filed September 4, 1926. Serial No. 133,581.

While my invention is applicable to the reproduction of sound waves generally it is more particularly designed for use in radio receiving sets, and consists essentially of an integral, thin-walled, generally spheroidal member having an opening at one point adjacent to which an armature is attached, a support for said member at a point remote from said opening, and an electro-magnet in the field of which said armature is located. The best form of apparatus at present known to me embodying my invention is illustrated in the accompanying sheet of drawings in which,

Fig. 1 is a vertical, central section of the apparatus, and

Fig. 2 is a horizontal section taken on line 2—2 of Fig. 1.

Throughout the drawings like reference characters indicate like parts. 1 is any suitable base, 2 a supporting member therein to which is fastened the core piece 3 of a magnet and the lower end of a vertical rod 4. This rod preferably is tubular, as shown, and at its upper end carries an internally threaded member 5 which supports the thin-walled hollow sphere 6 made of resonant material such as indurated fibre, hard rubber or other suitable constituents forming a substantially closed air chamber. 9 is a lock nut for holding member 5 in any position of adjustment. Rod 4 passes through an opening 7 at the lower pole of the sphere but is not in contact with it at that point, the member 6 being supported only at its upper pole and hanging free from that point.

8 is an armature, which may be annular in form, attached to sphere 6 adjacent to opening 7 and thereby supported in the field of the electro-magnet formed by coils 10, 10, wound on core piece 3, the terminals 11, 11 of which coils may be connected in circuit with the receiving set. Supporting member 2 may be removably mounted in base 1 by screws 12, 12.

In operation the impressed magnet impulses cause vibrations in armature 8 which are transmitted to sphere 6 and reproduced in the air, both inside and outside of sphere, giving forth clear and accurate duplications of the original sounds impressed on the microphone of the usual sending or broadcasting apparatus with which the receiving set is in tune. The sound waves in the interior of sphere 6 escape through opening 7 to mingle with and reinforce those generated on its exterior, and I believe that the excellent quality of the reproduction is due, in part at least, to the fact that, as the member 6 is integral in character, and uniform in curvature, and convexity, these two sets of sound waves differ only slightly in phase, one from the other, just sufficiently to bring out the overtones, but not sufficiently to produce any blurring or confusion by the combination.

Obviously various changes could be made in the relative arrangement and special construction of the constituent elements herein described and illustrated without departing from the principle of operation disclosed or entirely losing the advantages of my invention.

Having described my invention, I claim:

1. A loud speaker unit for sound reproducing having, in combination, a hollow, thin-walled spheroidal member of resonant material forming a substantially closed air chamber provided with a relatively small free opening in its walls, an armature fastened to said member adjacent said opening, means for supporting said member at a point remote from said opening, and an electro-magnet within the field of which said armature is located.

2. A combination such as defined in claim 1 in which said resonant member is a sphere, with the opening at its lower pole, and said support comprises a vertical rod passing through said opening.

3. A combination such as defined in claim 1 in which said resonant member is a sphere, with the opening at its lower pole, and said support comprises a vertical rod passing through said opening and provided with an adjustable, screw-threaded connection to the upper pole of sphere.

4. A combination such as defined in claim 1 in which said resonant member is a sphere, with the opening at its lower pole, and said support comprises a vertical rod passing through said opening and provided with an adjustable, screw-threaded connection to the upper pole of sphere and a base member in which the lower end of said rod and said electro-magnet are fastened exteriorly of said sphere.

EMIL F. HOLINGER.