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R. W. MORRIS
CONE LOUD SPEAKER

Filed June 30, 1925

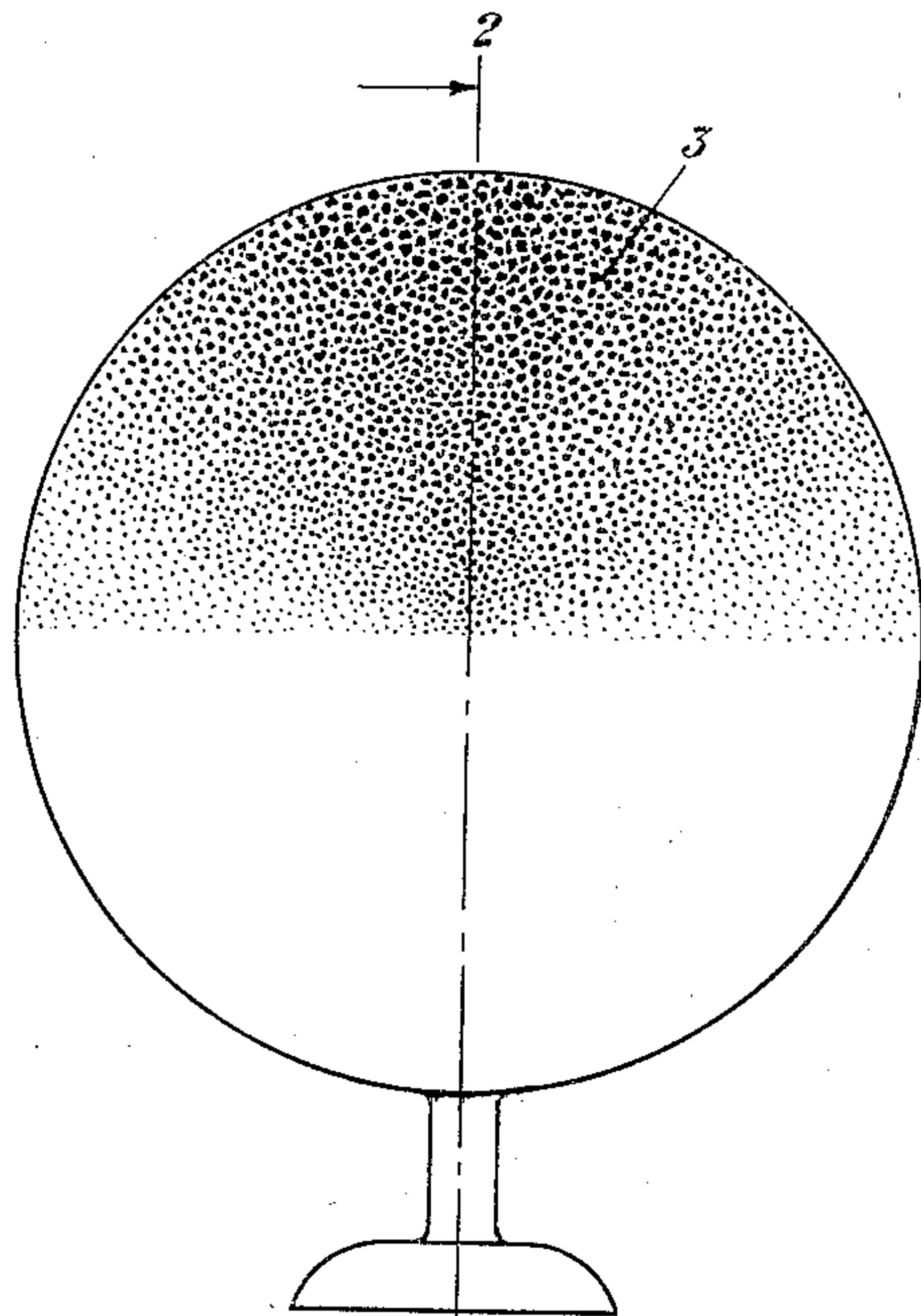


Fig. 1

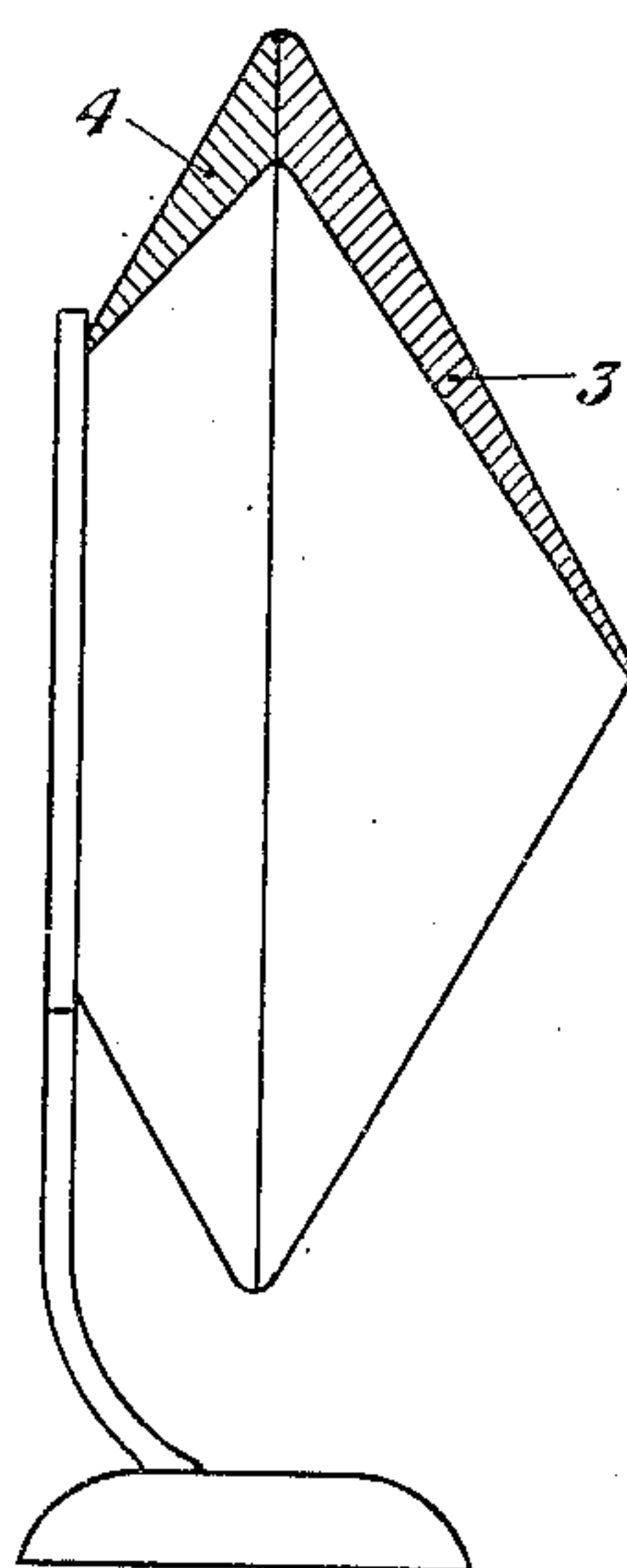


Fig. 2

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CONE LOUD-SPEAKER.

Application filed June 30, 1925. Serial No. 40,660.

This invention relates to loud speaking telephone receivers, and more particularly, to loud speaking telephone receivers of the cone type.

The chief advantage of the cone loud speaker over the horn type of loud speaker is that the former provides a large diaphragm, which produces greater efficiency for the lower frequencies than is the case with the horn type unless the horn is made so large that it would be inconvenient for ordinary residence use.

One type of cone loud speaker has the shape of a symmetrical, circular or right cone. A serious objection to this type is that the receiver has natural periods of vibration in the operating range of 50 to 5,000 cycles. This objection has been overcome in some cases by giving the loud speaker an asymmetrical construction—the so-called elliptical cone, in which the various segments of the cone have different natural frequencies, and the instrument is free from resonant effects. The asymmetrical cone, however, is objectionable on two grounds, first, that it is bulky and not pleasing in appearance, and second, that the load on the driving mechanism is unbalanced.

The object of applicant's invention described and claimed in this application is the production of a loud speaker which is not open to the first objection and yet meets the requirement that the resonant effects be eliminated.

In an application filed of even date herewith and numbered 40,661 applicant describes and claims a symmetrical cone loud speaker in which the load on the driving mechanism is balanced.

The invention which is the subject of this application will be clearly understood when the following description is read with reference to the accompanying drawing, which shows one desirable embodiment of the invention. Figure 1 of the drawing is a view of the receiver from the cone side, and Fig. 2 is a sectional view on the line 2—2 of Fig. 1 in the direction indicated by the arrows.

With reference to the details of the drawing, the cone and the frusto-cone are circular, but the portion 3 of the cone and the portion 4 of the frusto-cone are so formed as to overcome the objectionable resonant effects found in the ordinary circular receiver. The wall of the cone over the portion 3 and the wall of

the frusto-cone over the portion 4 are constructed so as to have a continuously varying thickness, the greatest thickness in each case being at the base. In Fig. 1 the heavier shading indicates the greater thickness. In Fig. 2 the thickness of the material is exaggerated and the continuous variation clearly shown. The continuously varying thickness may be obtained in any suitable way. With the ordinary use of paper for the construction of the receiver, the pulp of which the paper is made may be properly moulded to produce the varying thickness, or the variation may be obtained by pasting or otherwise attaching sheets of very thin paper of different areas to the ordinary symmetrical cone and frusto-cone. The variation of thickness obtained by the latter method is a sufficiently close approximation to a truly continuous variation. Viewed somewhat differently, this continuously varying thickness may be described as a continuously varying "loading" of a segment of the cone and a segment of the frusto-cone.

It is obvious to those skilled in the art that the form of applicant's receiver overcomes the difficulty of natural periods of vibration in the voice band frequencies since the different portions of the cone and the frusto-cone will have different natural frequencies and the device will be free from any resonant effect.

What is claimed is:

1. A cone loud speaking receiver having a portion of its wall of varying thickness and the balance of the wall of unvarying thickness.

2. A symmetrical cone loud speaking receiver having a portion of its wall of varying thickness and the balance of the wall of unvarying thickness.

3. A cone loud speaking receiver having a portion of its wall of continuously varying thickness, the greatest thickness being at the base of the cone, and the balance of the wall of unvarying thickness.

4. A cone loud speaking receiver having a segment of its wall of continuously varying thickness; the greatest thickness being at the base of the cone.

5. A loud speaking receiver comprising a conical portion and a frusto-conical portion, a part of each of said portions having a varying thickness and the balance of each of said portions having an unvarying thickness.

6. A loud speaking receiver comprising a

conical portion and a frusto-conical portion, a segment of each of said portions having a continuously varying thickness.

5 7. A symmetrical loud speaking receiver comprising a conical portion and a frusto-conical portion, a part of each of said portions having a varying thickness and the balance of each of said portions having an unvarying thickness.

10 8. A loud speaking receiver comprising a conical portion and a frusto-conical portion, a segment of each of said portions having a continuously varying thickness, the greatest thickness being at the bases of the cone and the frusto-cone.

15 9. A loud speaking receiver comprising a conical portion and a frusto-conical portion, a part of each of said portions having a continuously varying thickness, the greatest thickness being at the bases of the cone and the frusto-cone, and the balance of each of said portions having an unvarying thickness.

20 10. A cone loud speaking receiver in which no annular section is of uniform thickness.

25 11. A cone loud speaking receiver in which one portion has varying loading and the balance of the receiver has unvarying loading.

12. A cone loud speaking receiver in which one portion has continuously varying mass per unit area, the balance of the receiver having unvarying mass per unit area. 30

13. A loud speaking receiver comprising a conical portion and a frusto-conical portion, a part of each of said portions having continuously varying loading. 35

14. A loud speaking receiver comprising a conical portion and a frusto-conical portion, a part of each of said portions having varying loading and the balance of each portion having unvarying loading. 40

15. A loud speaking receiver comprising a conical portion and a frusto-conical portion, a part of each of said portions having continuously varying mass per unit area.

16. A loud speaking receiver comprising a 45 conical portion and a frusto-conical portion, a part of said portions having continuously varying mass per unit area and the balance of each portion having unvarying mass per unit area. 50

In testimony whereof, I have signed my name to this specification this 29th day of June, 1925.

ROBERT W. MORRIS.