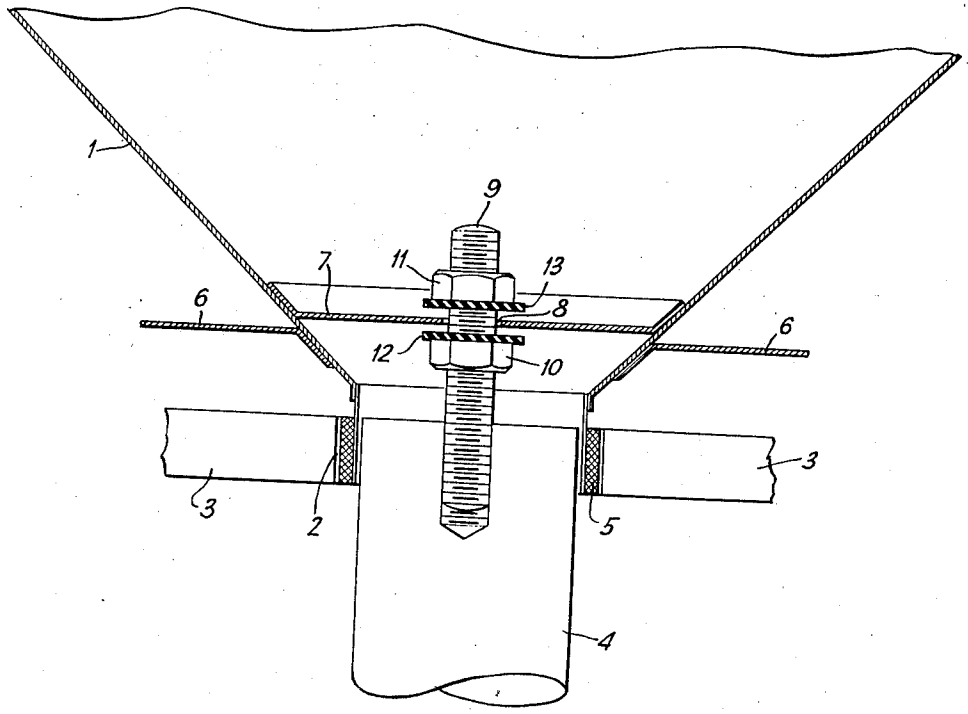
May 2, 1944.

A. SCHAAF

2,347,799

LOUDSPEAKER

Filed Sept. 5, 1941



INVENTOR
ALEXANDER SCHAAF
BY H. S. Grover
ATTORNEY

Patented May 2, 1944 2,347,799

UNITED STATES PATENT OFFICE

2,347,799

LOUD-SPEAKER

Alexander Schaaf, Berlin-Charlottenburg, Germany; vested in the Alien Property Custodian

Application September 5, 1941, Serial No. 409,598
In Germany September 4, 1939

3 Claims. (Cl. 179—115.5)

It is already known to provide an electrodynamic loudspeaker with an arrangement serving for limiting the movement of the oscillating body beyond a certain amplitude. In a known arrangement the stop pieces are mounted at the outside of the oscillation coil and act on the outer spiral centering member. In such an arrangement a very strong outer spiral is necessary so as to withstand the stress at abutting. The required strong construction of the spiral and the increase in weight and reduction of its movability thereby entailed involve considerable drawbacks. In addition, rather considerable difficulties are encountered in mounting the known arrangement.

The arrangement according to the present invention avoids the drawbacks of the known arrangement and provides an essentially better solution which moreover is much simpler and less expensive. In addition in the arrangement according to the novel feature the distances of the limiting pieces, and thus the amplitude from which the limiting action sets in is adjustable. The essential feature according to the new idea resides in that at the narrow or small end inside the diaphragm a disk is arranged having a hole through which a bolt extends without touching the disk and which is fastened to the center pole. This bolt carries the two stop pieces which are situated on different sides of the disk. The bolt has a thread so that the distance of the abutment pieces from the abutment disk can be set.

The accompanying figure shows an example of construction embodying the novel idea. The diaphragm 1 of the electrodynamic loudspeaker is provided with an oscillation coil 5 which protrudes into the air gap 2 between the pole plate 3 and the center pole 4. The oscillation coil 5 is centered in the airgap 2 by the outer centering means 6 which is known as such. The interior of the diaphragm 1 contains in the proximity of the small end a stop disk 7 which has a central opening 8 through which a bolt 9 is passed without coming in contact with the disk 7 whereby the said bolt is screwed into the center pole 4. The bolt 9 has screwed thereon the two stops 10 and 11. These stops are suitably cushioned with rubber designated by 12 and 13 respectively so that in this way impact noises which may be produced by the abutting and which would cause disturbances cannot appear. Obviously, it is not absolutely necessary that these stops be adjustable. The operation can also be carried out with fixed stops which have once been set. The disk 7 can be given an elastic action through hollowed out places in the material similarly to the known inner centering means, so as to absorb the impact in an elastic manner.

The new arrangement also has the essential advantage that after the correct setting of the stops and at the movements of the oscillatory coil caused by the sound frequency impulses the retractive force of the outer spiral is utilized in its linear range. Deviations of the oscillatory coil which exceed the amplitudes normally to be expected and which are produced by the noises are however limited in an unobjectionable manner. Thus the sensitive coil body is given protection against damages and the operating safety of the loudspeaker is thereby enhanced.

What I claim is:

1. In a loudspeaker, a cone diaphragm, a member for centering the diaphragm affixed thereto, a disk provided with a central aperture and having its peripheral edge secured to the inner surface of the diaphragm adjacent the small end thereof, a fixed member extending through the disk aperture with sufficient clearance to prevent contact between the disk and said member, and a pair of spaced stop members carried by the fixed member, one on each side of the disk, adapted to coact with the portion of the disk surrounding the disk aperture for limiting the amplitude of vibration of the diaphragm during normal operation of the loud speaker.

2. In a loudspeaker of the electrodynamic type, a cone diaphragm having attached to its small end a voice coil which is immersed in an air gap formed by a central pole and a pole plate, a disk provided with a central aperture having its peripheral edge secured to the inner surface of the diaphragm adjacent the small end thereof, a standard carried by the central pole passing through the disk aperture with sufficient clearance to prevent contact between the disk and the standard, a pair of adjustably spaced stop members carried by the standard, one on each side of the disk, adapted to coact with the portion of the disk surrounding the disk aperture for limiting the amplitude of vibration of the diaphragm during normal operation of the loud speaker.

3. In a loudspeaker of the electrodynamic type, a cone diaphragm having attached to its small end a voice coil which is immersed in an air gap formed by a central pole and a pole plate, an external member for centering the voice coil within the air gap, a disk provided with a central aperture having its peripheral edge secured to the inner surface of the diaphragm adjacent the small end thereof, a standard carried by the central pole passing through the disk aperture with sufficient clearance to prevent contact between the disk and the standard, and a pair of stop means adjustably carried by the standard, one on each side of the disk and spaced therefrom, adapted to coact with the portion of the disk surrounding the disk aperture for limiting the amplitude of vibration of the diaphragm during normal operation of the loud speaker.

ALEXANDER SCHAAF.