

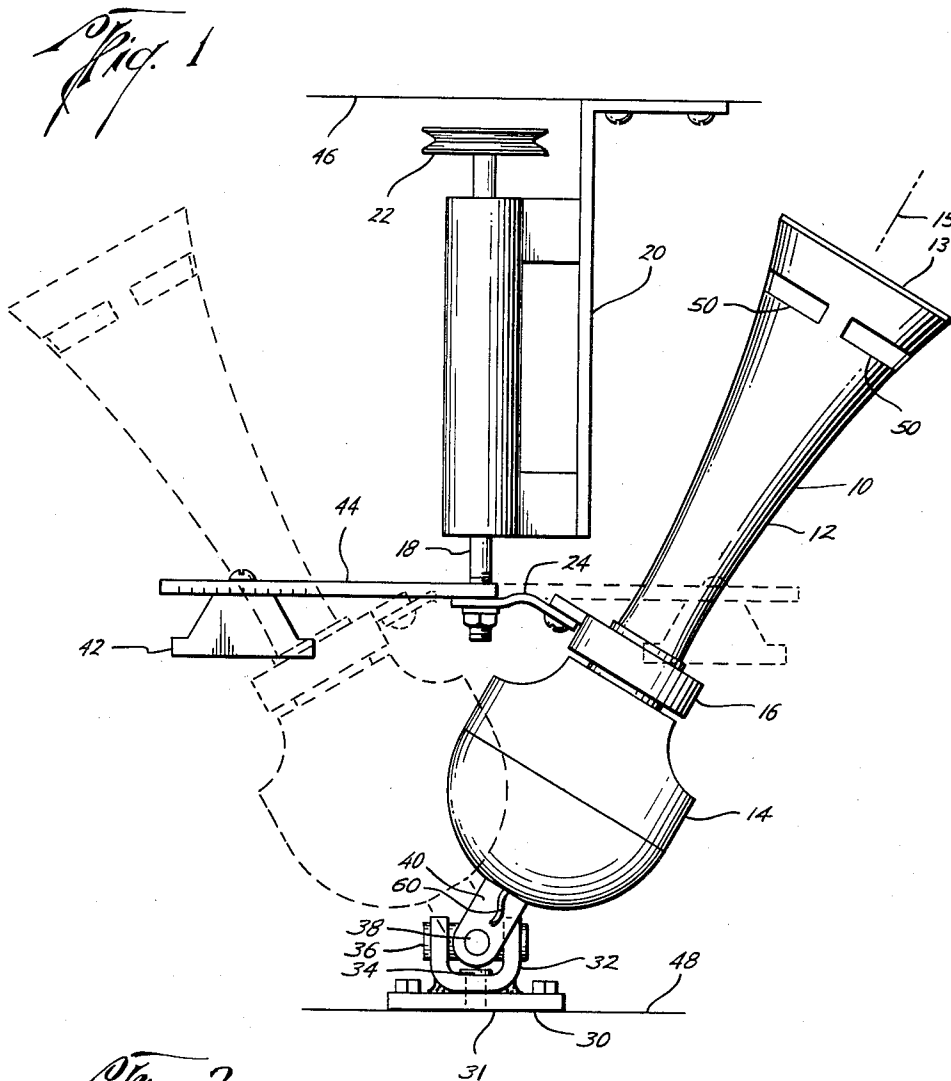
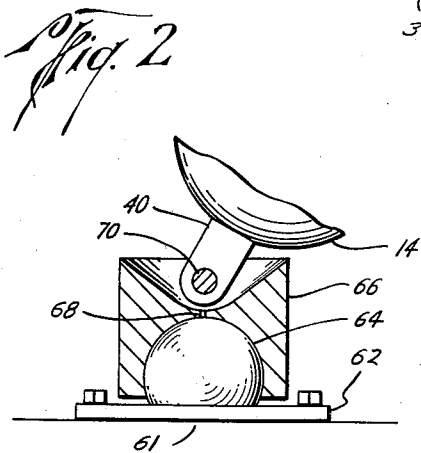
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SWIVELING ACOUSTICAL APPARATUS

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1

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SWIVELING ACOUSTICAL APPARATUS

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The present invention relates to a swiveling acoustical apparatus and, more particularly, relates to such apparatus which is useful in radiating and dispersing the sound from a loud speaker.

Generally, the radiation and dispersion of sound from a speaker and horn is highly directive in the direction of the horn opening, particularly for the medium and high frequencies. In order to increase the radiation pattern of the horn baffles, plugs and other directional structures have been inserted in the horn opening. It has been recognized that the sound distribution pattern may be increased by rotating the horn about one end as disclosed in the patents to Leslie, dated December 23, 1952, Patents Nos. 2,622,692 and 2,622,693. The present invention is directed toward improvements in the distribution pattern of sound by providing a swiveling horn and also to provide desirable variations in the sound emitted by the horn by providing openings in the horn.

It is an object of the present invention to provide an improved swiveling horn and one that has improved tone qualities.

It is a further object of the present invention to provide openings in a swiveling horn which produce variations in the sound emitting from the horn.

A further object of the present invention is the provision of an improved swiveling horn which produces a stereophonic effect on the emitted sound.

Yet a further object of the present invention is the provision of a swiveling horn having openings in its sides through which standing air passes as the horn is swiveled about one end thereby radiating the sound and producing overtones and harmonics.

A still further object of this invention is the provision of a swivel joint about which the horn is rotated so that electrical brushes and the consequential brush noise may be eliminated.

Other and further objects, features and advantages will be apparent from the following description of presently preferred embodiments of the invention, given for the purpose of disclosure, and taken in conjunction with the accompanying drawing, where like character references designate like parts throughout the several views, and where

FIGURE 1 is an elevational view illustrating an apparatus according to the invention in two different positions, one position shown in solid lines and the other shown in dotted lines, and

FIGURE 2 is an elevational view, partly in cross-section, illustrating a modification of a swivel joint.

Referring now to the drawing, and particularly to FIGURE 1, the reference numeral 10 generally designates the swiveling acoustical apparatus of the present invention and includes the speaker or driver 14 and horn 12 rotatably supported by a rotatable shaft 18 and further supported by a swivel joint 30. Electrical conductors 60 provide the electrical sound input to the driver 14.

A circular support 16 is rotatably secured to the horn 12 and supports the horn 12 and its attached driver 14. This rotatable support is secured to a rotating shaft 18 by the arm 24 by any conventional means such as a nut and thread arrangement. The swiveling acoustical apparatus 10 is generally located in an acoustical cabinet (not shown) which includes the sides 46 and 48. The rotatable shaft 18 may be suitably supported by means of a stationary support 20 secured to an enclosure side

2

46. The shaft 18 is rotated by any conventional means such as a motor and belt drive (not shown) connected to the pulley 22.

A counter weight 42 is provided and suitably secured to the shaft 18 by arm 44. Counter weight 42 is connected to the shaft 18 opposite the horn 12, as is conventional, to counteract the weight of the horn and driver when the apparatus is rotated.

The swivel joint connection 30 which supports and is attached to driver 14 includes a base 31 which may be secured to a cabinet side 48 and a substantially U-shaped member 32 which is rigidly secured to support plate 31 so as to prevent any rotation of member 32. Rod member 36 is supported by and rotates in the U-shaped member 32 so as to provide a rotating member in one direction for the support horn 12 and driver 14. A pivot member 38 is secured to rod 36 in a perpendicular plane and provides a pivot for the U-shaped bracket or linkage 40 which is connected to the horn 14. Pivot 38 thereby provides a rotatable movement in a perpendicular direction from that provided by rod 36. Therefore, the swivel joint connection 30 follows the horn 12 and driver 14 as it is rotated about the shaft 18, but prevents the horn 12 and driver 14 from rotating about their own axis 15 thereby preventing electrical sound input line 60 from being twisted.

Openings 50 may be provided adjacent the open end 13 of the horn 12 in the sides of the horn. Thus, as the horn is swiveled about the shaft 18, the standing air in the path of rotation passes through the openings 50 of the horn and produce harmonics, overtones and further modifies the radiation pattern to obtain a still broader distribution of sound. The broadening of the radiation patterns by the openings 50 is especially desirable since the horns ordinarily have strong directive qualities, especially in connection with the medium and high frequencies. Of course, other shapes, positions and sizes of openings in the sides in the direction of rotation may be provided in the horn.

Another form of the swivel joint connection for allowing a swivel motion of the horn and driver, but preventing their rotation about their own axis 15 is best seen in FIGURE 2. A ball and socket joint is provided in which the ball 64 is connected to the plate 62 and secured against rotation and the socket joint 66 is keyed to the ball 64 by means of a conventional key and keyway 68 so that the socket 66 may move in only a single direction with reference to the ball 64. A pivot 70 is connected to the socket 66 in a position parallel to the keyway 68 and provides a pivoting action perpendicular to the pivoting action of the ball and socket connection for the supporting linkage 40 and driver 14.

In use, the swiveling horn 10 is continuously rotated by the shaft 18 and its drive means (not shown) at a predetermined speed and the electrical input is fed to the speaker or driver 14 by the electrical input circuit 60. As the horn is rotated about the shaft 18 it is allowed to swivel by the swivel joint 30 or 61 which follows the rotation and supports the linkage 40 and the lower end of the horn-driver unit, but prevents the rotation of the horn-driver unit about its axis 15. The rotatable ring support 16 slips about the horn 12 as the rotation about axis 15 is prevented. The sound input circuit 60 is thereby prevented from rotating on itself and being twisted off. This arrangement advantageously provides an oscillating or rotating horn without the necessity of electrical brushes and the consequential brush noise. As the horn 12 is swiveled the sound is emitted from the end 13 of the horn and a tremolo or vibrato is produced caused by the rotation of the mouth of the horn forward and away from the listener and at the same time standing air is passed into the horn and also through the horn by the

3

openings 50 thereby radiating the sound emitted by the horn and producing overtones and harmonics.

The present invention, therefore, is well adapted to carry out the objects and attain the ends and advantages mentioned as well as others inherent therein. While presently preferred embodiments of the invention are given for the purpose of disclosure, numerous changes in the details of construction and arrangement of parts may be made which will readily suggest themselves to those skilled in the art and which are encompassed within the spirit of the invention and the scope of the appended claims.

What is claimed is:

1. A swiveling acoustical apparatus comprising, a driver, a horn including an opening at one end directing sound from the driver, supporting means connected to and supporting said horn and driver, rotating means connected to said supporting means for continuously rotating the supporting means and the horn, a swivel joint connected to said driver, and a fixed supporting element, said element rigidly connected to the swivel joint thus preventing rotation of the swivel joint.

2. The invention of claim 1 wherein the horn includes opening in the sides near the opening at one end whereby on rotation of the horn air passes through said side openings to provide variations in the sound of the horn.

3. The invention of claim 2 wherein the openings in the horn are in the sides in the path of rotation of the horn.

4. A swiveling acoustical apparatus comprising a driver, a horn including an opening at one end directing sound from the driver, a rotatable shaft, a supporting arm secured to said rotatable shaft and connected to said horn, said horn supported at an angle to the rotatable shaft, means to continuously rotate the shaft, a swivel joint connected to said driver, fixed supporting

4

means, said supporting means rigidly connected to and preventing rotation of said swivel joint.

5. A swiveling acoustical apparatus including a housing comprising a driver, a horn one end of which is connected to said driver and the other end is opened directing sound from the driver, a rotatable shaft, a supporting arm secured to said rotatable shaft and rotatably connected to said horn and driver, said driver connected at an angle to said shaft, means to continuously rotate the shaft, and a swivel joint connected to said driver, said swivel joint including means allowing only transverse joint movement, and means allowing only lateral joint movement, said housing rigidly attached to the swivel joint thereby preventing rotation of the swivel joint.

6. The invention of claim 5 wherein the swivel joint includes a substantially U-shaped support member secured to the housing, a first rod rotatably secured in the U-shaped support, a second rod perpendicularly secured to said first rod, and a connecting arm rotatably secured to said second rod and secured to said driver.

7. The invention of claim 5 wherein the swivel joint includes a ball and socket connection in which the ball is secured to the housing and against rotation and the socket is slidably keyed to the ball, a rod support secured to the socket parallel to the keyway, and a connecting arm rotatably secured to said rod and secured to said driver.

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