W. SPARKS.

HORN.

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1,048,466.

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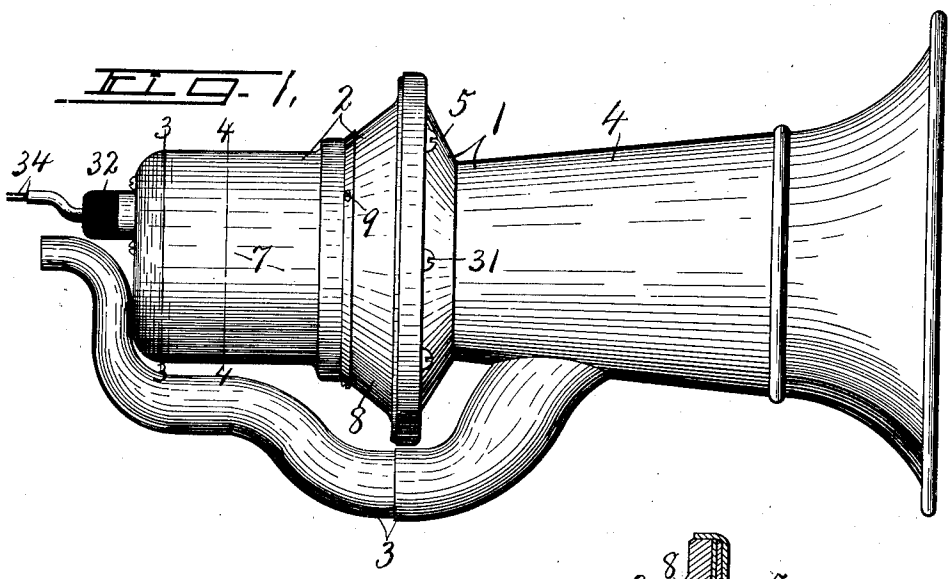

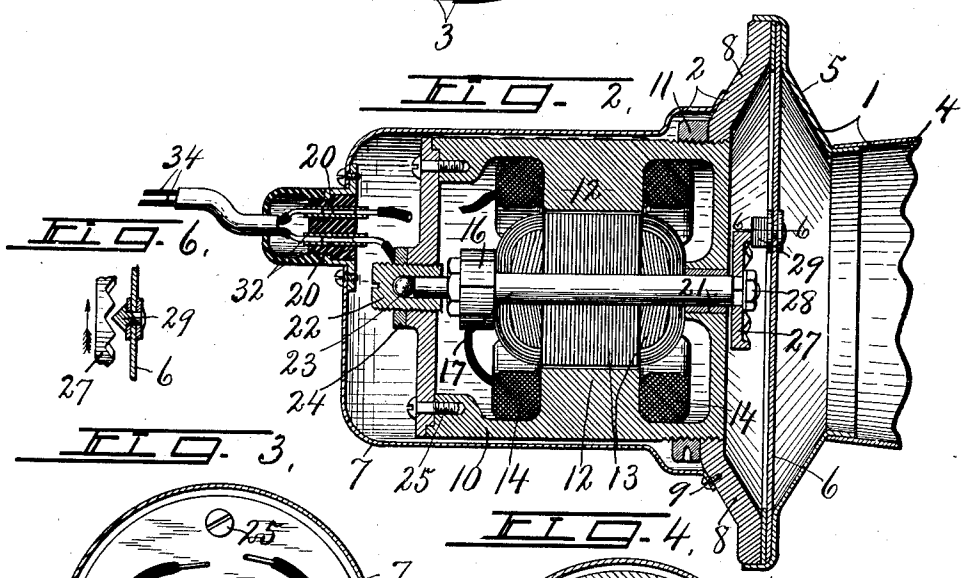

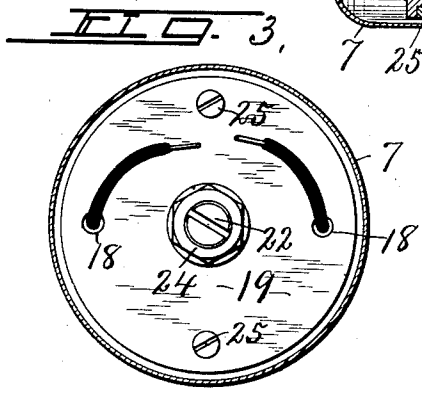

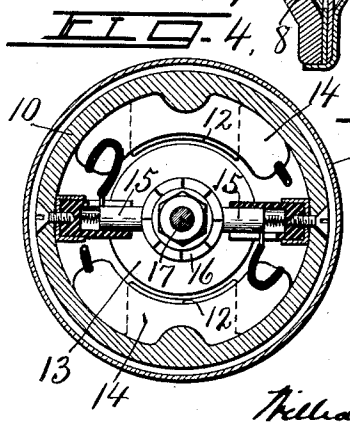

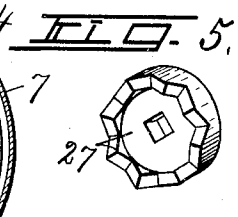

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UNITED STATES PATENT OFFICE.

WILLIAM SPARKS, OF JACKSON, MICHIGAN.

HORN.

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Application filed May 9, 1912. Serial No. 696,216.

To all whom it may concern:

Be it known that I, WILLIAM SPARKS, of Jackson, in the county of Jackson, in the State of Michigan, have invented new and useful Improvements in Horns, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in horns for automobiles and other self-propelled vehicles in which an electric motor is employed as the driving element for a suitable sound producing device consisting of a diaphragm having a projection thereon and a toothed member actuated by the motor against the projection so as to vibrate the diaphragm.

The main object is to construct a device of this character from a minimum number of parts and to assemble such parts in compact relation so as to occupy a relatively small space.

Another object is to provide for the relative adjustment of the sound producing members so as to enable them to be easily and quickly assembled and maintained in proper relation to compensate for wear.

Other objects and uses will be brought out in the following description.

In the drawings—Figure 1 is a side elevation of a horn embodying the various features of my invention. Fig. 2 is an enlarged sectional view through the motor and diaphragm and inclosing case therefor showing more particularly the means for adjusting the sound producing members. Figs. 3 and 4 are transverse sectional views through the motor case and shell taken respectively on lines 3—3 and 4—4, Fig. 1. Fig. 5 is a perspective view of the rotary sound producing member. Fig. 6 is a detail sectional view through the projection on the diaphragm showing a face view of a portion of the toothed wheel.

The horn herein illustrated is of the combination type adapted to be operated electrically or by a pneumatic compression bulb, and for this purpose is provided with an amplifier —1— rigidly secured to one end of a motor case —2— and provided with a branch tubular extension —3— extending lengthwise along and partially across one end of the motor case —2— for connection with any suitable tube to which the compression bulb (not shown) is attached.

The amplifier —1— preferably consists of two oppositely flaring sections —4— and —5— having their small ends telescoping and fitted snugly one upon the other as shown more clearly in Fig. 2, the section —4— being of considerably greater length than the section —5— which latter has a more abrupt flare for direct application to the marginal edges of a suitable diaphragm —6— so as to leave a clear open space for the vibration of the central portion of the diaphragm and passage for the sound waves produced thereby.

The motor case —2— comprises a cylindrical cup-shape jacket —7— preferably of sheet metal and an enlarged cast metal ring —8— secured by suitable fastening means as screws —9— to the open end of the jacket —7— as shown more clearly in Figs. 1 and 2.

The motor which is inclosed within the casing —2— comprises a cylindrical cup-shape shell —10— of cast iron or other magnetizable material arranged coaxially within the jacket —7— with its closed end facing the diaphragm —6— and threaded externally for receiving the internally threaded ring —8— and thereby permitting said shell and ring to be adjusted endwise relatively to each other for a purpose hereinafter described, the shell —10— and ring —8— being locked in their adjusted positions by a jam nut —11— also engaging the externally threaded portion of the shell —10—. The intermediate portion of the shell —10— is provided with inwardly projecting diametrically opposed pole pieces —12— integral therewith and spaced apart a sufficient distance to receive a rotary armature —13—.

Surrounding the pole pieces are field coils —14— having one end thereof electrically connected to suitable brushes —15— which contact with the periphery of a commutator —16— on the outer end of the armature shaft as —17—, the other ends of the coils being passed through apertures —18— in a cap —19— covering the outer end of the shell —10— and are connected to binding posts —20—.

The armature shaft —17— is journaled

for axial adjustment in suitable bearings —21— and —22— on the inner end of the shell —10— and cap —19— respectively, the bearing —22— being provided with an end-thrust ball bearing —23— and is threaded externally and engaged in a threaded aperture centrally in the cap —19— for the purpose of adjusting the shaft endwise to bring the sound producing members, presently described, into proper relation, said bearing —22— being held in its adjusted position by a lock nut —24—. The cap —19— is rigidly secured to the adjacent end of the shell —10— by suitable fastening means as screws —25— and is also preferably made of cast metal and adapted to form a continuation of the shell —10— to completely house the armature and field of the motor, thereby excluding dust or other foreign matter therefrom.

A toothed wheel —27— is rigidly secured to the inner angular end of the shaft —17— by means of a clamping nut —28— and is provided with beveled-face teeth operating against a projection —29— which is secured by a rivet or other fastening means to the diaphragm —6— in the path of the teeth of the wheel —27— so as to vibrate the diaphragm and thereby produce the desired sound waves as the motor is rotated.

The marginal edge of the diaphragm is rigidly held between the marginal edges of the base section —5— of the amplifier and ring —8—, both of which are concavo-convex in cross section arranged with their bases in juxta-position and secured together by suitable fastening means as screws —31— so as to form a lenticular hollow receiver in which the greater portion of the diaphragm is adapted to play.

The binding posts —20— are secured in a suitable insulating bushing —32— in the outer end of the jacket —7— said bushing being composed of threaded sections for detachable connection one with the other, one of which sections is rigidly secured to the adjacent end of the jacket, while the outer section is provided with a central aperture for receiving the adjacent ends of the lead wires —34— which are also connected with a slip connection to the binding posts —20— and may be connected to any suitable source of power and switch carried by the vehicle on which the horn is mounted.

It will be seen from the foregoing description that the various parts of this device may be easily and quickly assembled and that when so assembled are firm and always maintain their proper relation to each other and at the same time by removing the jacket —7— and loosening the lock nut —11—, the shell —10— and ring —8— may be rotarily and axially adjusted one upon the other to bring the toothed wheel —27— and projection —29— into proper co-action either to take up wear or to vary the tone of the sound produced thereby, or a similar adjustment of the toothed member —27— may be made relatively to the projection —29— by adjusting the shaft —17— endwise through the medium of the adjusting screw —22— by simply loosening the lock nut —24—.

In assembling the parts of my invention, the ring —8— and diaphragm —6— are secured in the manner described to the adjacent end of the amplifier after which the motor shell —10— with the motor therein including the cap —19— and toothed wheel —27— may be screwed into the central threaded opening in the ring —8— and when the toothed wheel —27— is properly adjusted relatively to the projection —29—, may be locked in this position by the lock nut —11—. This adjustable connection between the ring —8— and shell —10— is more for the purpose of varying the degree of engagement between the teeth of the wheel —27— and projection —29— for varying the tone, while the adjusting screw —22— is more for the purpose of adjusting the wheel —27— to take up wear. When the shell is assembled upon the ring and amplifier in the manner described, the jacket —7— is placed in operative position to form a protective shield to prevent the entrance of dust or other injury to the interior mechanism.

What I claim is:

1. In a horn, an electric motor having an inclosing shell provided with an open end, a removable cap across the open end and provided with a bearing for the motor shaft, a ring adjustable lengthwise of and upon the shell, an amplifier secured to the ring, a diaphragm having its marginal edges secured between the amplifier and ring, a projection on the intermediate portion of the diaphragm, and a toothed wheel on the motor shaft operating against the projection to vibrate the diaphragm.

2. In a horn, an electric motor having an inclosing cup-shaped shell threaded externally at one end, a removable cap across the open side of the shell and provided with a bearing for the motor shaft, an internally threaded ring screwed upon the threaded end of the shell, an amplifier secured to the ring, a diaphragm having its marginal edges secured between the amplifier and ring, a projection on the intermediate portion of the diaphragm, a toothed wheel on the motor shaft operating against the projection to vibrate the diaphragm, and means for adjusting the motor shaft and toothed wheel axially toward the diaphragm.

3. In a horn, an electric motor having a cup-shape shell of magnetizable material, the base of the shell being threaded externally, an internally threaded ring screwed upon the base of the shell whereby the shell

may be adjusted endwise in the ring, means for locking the shell in its adjusted position, a cap across the open side of the shell and provided with a bearing for the motor shaft whereby said shaft may be adjusted endwise, a toothed wheel on the opposite end of the shaft, a diaphragm secured to the ring and extending across the adjacent end of the shaft, and a projection on the diaphragm in the path of the teeth of the wheel whereby the rotation of the wheel will cause the vibration of the diaphragm.

In witness whereof I have hereunto set my hand on this 6th day of May 1912.

WILLIAM SPARKS.

Witnesses:

LILLIAN WUNDERLICH,

W. J. CORBETT.