Oct. 14, 1924. 1,511,348

W. KAISLING

MOTOR HORN

Filed April 21, 1920 3 Sheets-Sheet 1

Fig. 2.

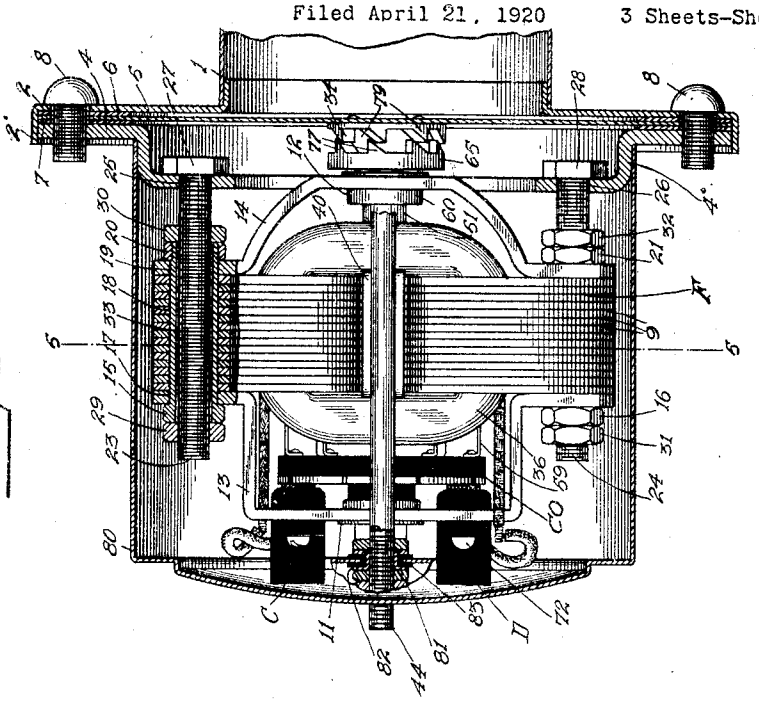
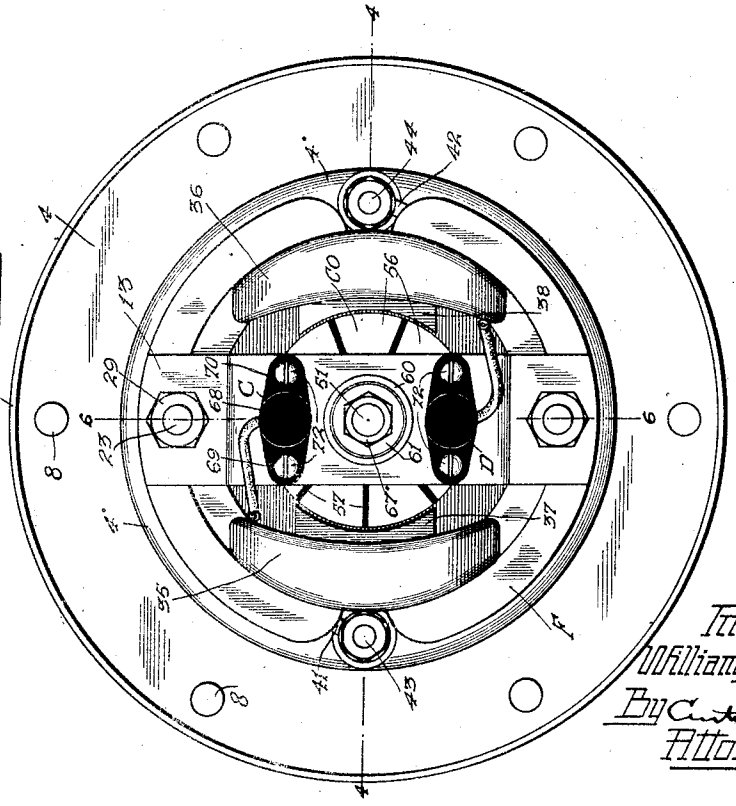


Fig. 1.



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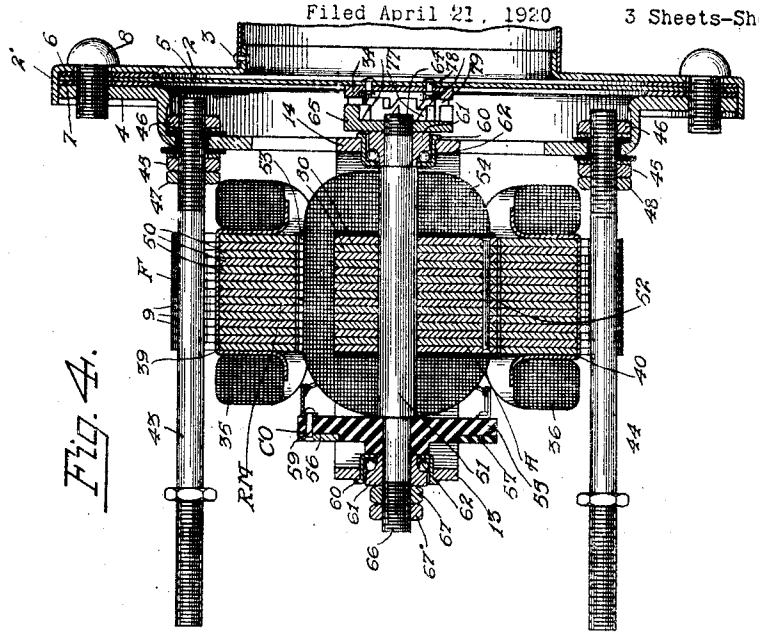

Fig. 4.

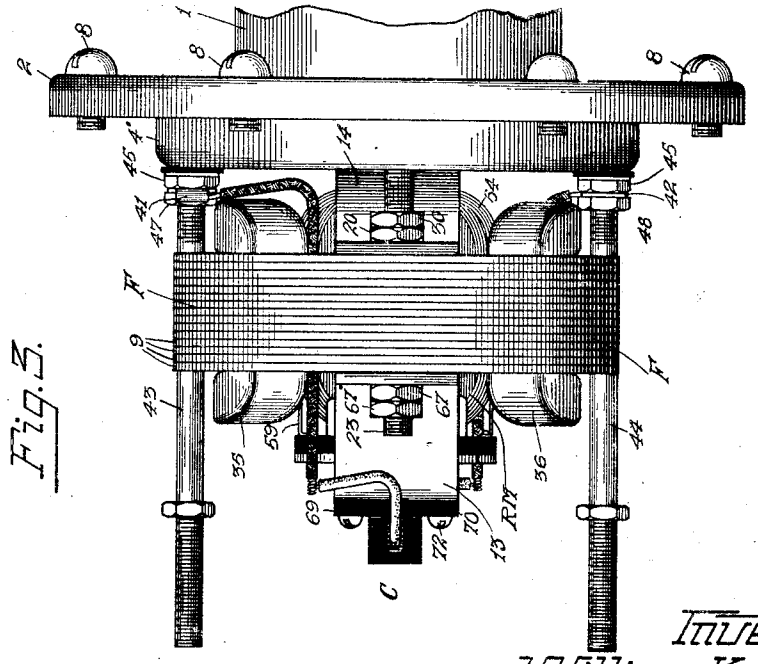

Fig. 5.

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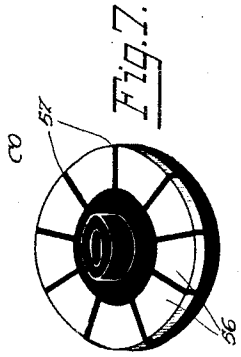

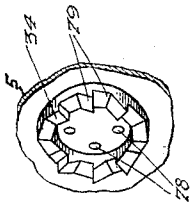

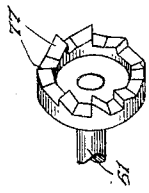

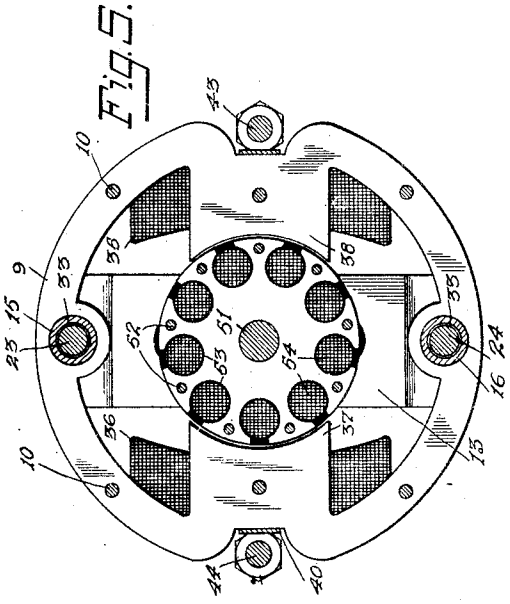

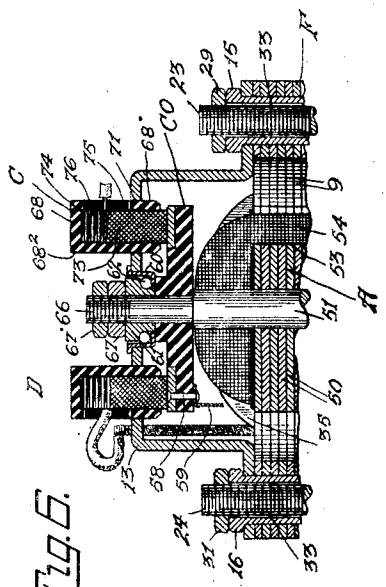

Inventor:
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By Curtis B. Camp.
Attorney

Patented Oct. 14, 1924. 1,511,348

UNITED STATES PATENT OFFICE.

WILLIAM KAISLING, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

MOTOR HORN.

Application filed April 21, 1920. Serial No. 375,489.

To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States, and residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Motor Horns, of which the following is a specification.

My invention relates to signaling devices, and has to do more particularly with signaling horns, such as are usually employed as warning on automobiles and the like.

My invention is particularly directed to electrically operated signaling horns, including a vibratile member, such as a diaphragm, a small rotary motor, and an enclosing casing provided with a resonator or horn. The small rotary motor is located directly behind the diaphragm, whereby a vibratory motion of the diaphragm may be derived from the drive shaft of the small rotary motor. The motor is small and compact in construction, low in current consumption, and may be operated from a low voltage storage battery, which is now practically universally used in conjunction with the ignition and lighting system of an automobile.

A feature of my invention is the construction of a laminated field piece, which with its parts as a whole, is adjustably secured in relation to the wear piece or contact button upon the diaphragm.

Another feature of my invention resides in the construction of the removable motor brush holder suitably supported in operative association with the commutator, which commutator is in the form of a flat disc.

A further feature of my invention resides in the novel means for connecting the external wires or leads with the terminals of the motor, which means is also used to secure the cover-cap of the device in position.

A still further feature resides in the manner in which the motor armature and its parts are supported by a pair of supporting strips secured to the field piece.

And a still further feature of my device resides in the construction of the device whereby the field piece is supported in a plane parallel to the plane of the diaphragm of the device and the motor shaft is supported at angles to the diaphragm and field piece.

The above features as pointed out, as well as others, will be more fully pointed out in the ensuing specification and claims.

For a more complete understanding of my invention reference may be had to the accompanying drawings, in which like reference characters in the several views denote like parts, and in which—

Fig. 1 is a rear elevation of the signaling horn of my invention;

Fig. 2 is a right side elevation of Fig. 1 with the protective casing in section;

Fig. 3 is a top view of Fig. 1;

Fig. 4 is a sectional view along the line 4—4 of Fig. 1;

Fig. 5 is a sectional view along the line 5—5 of Fig. 2;

Fig. 6 is a sectional view along the line 6—6 of Fig. 1;

Fig. 7 is a perspective view of the commutator;

Fig. 8 is a perspective view of the ratchet secured to the shaft; and

Fig. 9 is a perspective view of the ratchet which is carried by the diaphragm of my device.

Referring now more in detail to my invention as illustrated, it comprises a resonating horn 1, only a portion of which is shown, suitably secured to the front plate 2 in any suitable manner, as by means of the rivets 3. A mounting plate 4 is provided to which the apparatus as a whole is secured, as will be more fully hereinafter described. A diaphragm 5 of suitable material is secured to the front plate 2 with a packing ring 6 of any suitable material, such as cork, between it and the front plate 2. A packing ring 7 is then placed between the diaphragm 5 and the mounting plate 4. The front plate 2, diaphragm 5, packing rings 6 and 7, and mounting plate 4 are then securely clamped together by means of clamping screws 8, which screws 8 pass through suitable openings in the members and have screw-threaded engagement with suitable tapped openings in the mounting plate 4. The screws 8 circumferentially clamp the diaphragm 5 between the mounting plate 4 and front plate 2.

Referring now to the small rotary motor RM, it comprises a ring-shaped field piece F, which is micrometrically adjustably supported by the mounting plate 4. The field

piece F is built up of a plurality of ring-shaped laminations 9, suitably riveted together by means of the rivets 10. The armature A of the rotary motor RM is supported in bearings 11 and 12 which are located in the bridge plates 13 and 14, and will be more fully hereinafter described. The bridge plates 13 and 14 are secured to the field piece F by means of the bolts 15 and 16, which bolts pass through suitable openings 17, 18 and 19 in the bridge plate 13, field piece F and bridge plate 14, respectively. The bolts 15 and 16 protrude slightly through the bridge plate 14 and their protruding ends are threaded to receive the nuts 20 and 21, thus securing the bridge plates 13 and 14 to the field piece F. A pair of threaded studs 23 and 24 are provided to support the field piece F, and its parts as a whole, and suitable tapped openings 25 and 26 are provided to receive the studs 23 and 24, and the hexagonal heads 27 and 28 with which the studs 23 and 24 are provided, engage the face of the mounting plate 4 when the said studs are in place. The stud 23 is provided with a pair of nuts 29 and 30, and likewise the stud 24 is provided with nuts 31 and 32 for holding the motor in its adjusted position. The bolts 15 and 16 are provided with suitable openings 33 through which the studs 23 and 24 extend, permitting the motor RM as a unit to be moved relative to the impact button or anvil 34 secured to the diaphragm 5.

To adjust the motor M relative to the wear piece 34, it is only necessary to loosen nuts 29 and 31 on the studs 23 and 24, respectively, and turn the nuts 30 and 32 to the right or left, depending on whether it is desired to move the motor RM away or toward the anvil 34. When the motor RM, as a whole, is adjusted in relation to the anvil 34, the nuts 29 and 31 are tightened to securely hold the motor RM in its adjusted position.

Field coils 35 and 36 are provided which are suitably secured upon the pole pieces 37 and 38 of the field piece F, the said pole pieces being integrally formed with the laminations 9, which laminations 9, when assembled to form the field piece F, form the pole pieces 37 and 38. The coils 35 and 36 are supported upon the pole pieces 37 and 38 against displacement in any suitable manner, as by means of the straps 39 and 40. Terminals 41 and 42 are insulatingly secured to the mounting plate 4 by means of the threaded studs 43 and 44, which studs 43 and 44 are suitably insulated from the mounting plate 4 and secured thereto by means of the nuts 45 and 46. The terminal 41 which is secured to the stud 43 by means of the nut 47 serves as one terminal for the field winding 35, and the terminal 42 which is secured to the stud 44 by means of the nut 48 serves as one terminal for the field winding 36. The other terminal of the field winding 35 extends to the brush C of the motor RM, and the other terminal of the field winding 36 extends to the brush D of the motor RM. The studs 43 and 44 also serve as terminals for the external leads that connect to the circuit closer and battery.

A laminated armature A for the motor RM is centrally positioned between the pole pieces 37 and 38 of the ring-shaped field piece F, the said armature A being built up of a plurality of discs 50 which are fitted upon the shaft 51 in any suitable manner, as by means of a drive fit, the said laminations being held together as a unit A by means of the rivets 52, the said shaft 51 being arranged with its axis at right angles to the diaphragm 5. The armature A has a plurality of circular slotted orifices 53 extending lengthwise of the armature, and windings 54 of the armature A are contained in these orifices and the terminals of these windings are connected to the terminals of the commutator CO.

The commutator CO is suitably mounted upon the shaft 51 by means of a drive fit, and it comprises a disc 55 of suitable insulation material and carries the commutator segments 56. The segments 56 are radially disposed upon the disc 55 and are suitably spaced by means of insulation strips 57 to properly separate the commutator plates 56 from each other. The plates 56 are secured to the disc 55 in any suitable manner as by means of rivets 58, and each plate 56 is provided with a terminal 59, which is secured to the bottom face of the disc 55 by means of the rivets 58, and each terminal 59 forms a terminal for a winding of the motor armature winding.

I rotatably support the motor shaft 51 and its parts as a whole in bearings 11 and 12, which are located in the bridge plates 13 and 14, the said bridge plates 13 and 14 being secured to the field piece F as already described. The bearings that rotatably support the shaft 51 are of the well-known ball bearing type, consisting of the usual ball-race or cup 60, cone 61 and ball bearings 62. The cones 61 are fitted tightly upon the shaft 51. The end 64 of the shaft 51, which protrudes through the cone 61 is threaded to receive the agitator 65. The cone 61 of bearing 11 is slipped on the end 66 of the shaft 51, and an adjusting nut 67, which has screw-threaded engagement with the threaded end 66 of the shaft 51, is turned to force the cone 61 of bearing 11 down and when the proper adjustment of the shaft 51 is obtained, that is, against longitudinal movement, a lock nut 67′, having screw-threaded engagement with the threaded end 66 of the shaft 51 holds the said shaft 51 in its adjusted position.

The brushes C and D are suitably sup-

ported in the bridge plate 13, and as both are similarly constructed, I will describe the brush holder C only. The brush holder C comprises a cylindrical shell 68 of suitable insulation material, and is provided with wing portions 69 and 70, integrally formed with the shell 68. A suitable opening 71 is provided in the bridge plate 13 and is of a size to receive the lower portion 68′ of the shell 68, and when in position in the said opening 71, the wing portions 69 and 70 rest against the face of the bridge plate 13. The holder C when in position as just described is secured to the bridge plate 13 by means of screws 72 which pass through suitable openings in the wing portions 69 and 70, and have screw-threaded engagement with suitable tapped openings in the bridge plate 13.

The motor brush 73 is made of any suitable material, such as wire gauze, rolled to form a brush, and of a size to fit into the orifice 74 in the shell 68. The lead to the motor brush 73 is passed through a suitable slot 75 cut in the upper portion 68^2 of the shell 68, and then soldered to the said brush 73. To obtain the proper bearing pressure of the brush 73 against the commutator face of the commutator CO, I provide a coil spring 76 which is placed in the shell 68 behind the brush 73, and the tension of the spring 76 is such that the brush 73 receives the proper bearing pressure to maintain it in engagement with the segments 56 of the commutator CO.

The end 64 of the shaft 51 which protrudes through the cone 61 of the bearing 12 is threaded to receive the agitator 65 which is circular in shape and provided with a plurality of serrations or teeth 77 in the form of face projections. A wear piece or anvil 34 is provided and secured to the diaphragm 5 in any suitable manner, as by means of rivets 78, and is provided with a plurality of projections or teeth 79 in the form of face projections, so that upon the rotation of the shaft 51, the teeth 77 of the agitator 65 engage the teeth 79 of the anvil 34 causing the vibration of the diaphragm.

I provide the members 65 and 34 each with nine teeth and the commutator with nine segments, so that I may obtain the maximum pulling power from the motor at the moment the teeth of the agitator 65 engage the teeth of the anvil 34. The commutator CO is secured to the shaft 51 and adjusted in such a position relative to the agitator 65 that when the teeth of the agitator 65 are just engaging the teeth of the anvil 34, the brushes C and D will be engaging the commutator CO in such a manner as to give the motor its maximum torque.

A suitable enclosing casing or cap 80 is provided, and of a size to fit over the cup-shaped portion 4′ of member 4. The threaded studs 43 and 44 pass through suitable openings 81 in the bushings 82, which bushings are suitably insulated from the casing 80. The studs 43 and 44 form terminals for the external leads, but are insulated from the cap 80 by means of the insulated bushings 83.

In assembling the horn and attuning the same, the nuts 29, 30, 31 and 32 are loosened so as to permit the entire motor to slide along the studs 23 and 24 to or from the diaphragm 5, and when the desired tone has been developed, that is, the proper relation between the agitator 65 and the anvil 34, the nuts 29, 30, 31 and 32 are set to lock the motor in its adjusted position.

While the invention has been described with particular reference to the details of construction, it is to be understood that it is not limited thereto, as many changes and modifications may be made therein, without departing therefrom, and I, therefore, wish to cover all such changes and modifications as come within the spirit and scope of the appended claims.

What I claim as new and desire to secure by United States Letters Patent, is as follows:

1. In a motor horn, a mounting plate, a diaphragm attached thereto, a wear-piece secured to said diaphragm, a field piece mounted in a plane parallel to the plane of said diaphragm, an armature shaft mounted at right angles to the plane of said diaphragm and carrying an agitator for contact with the wear-piece on said diaphragm, a pair of supporting bridges connected to said field piece, bearings supported by said bridges supporting and preventing the endwise movement of said shaft, and means for adjusting said motor and agitator as a unit relative to said wear piece, said means serving to support the field piece and said bridges upon the mounting plate.

2. In a motor horn, a mounting plate, a diaphragm provided with a wear piece and attached thereto, a field piece mounted in a plane parallel to the plane of said diaphragm, an armature shaft mounted at right angles to the plane of said diaphragm and carrying an agitator for contact with the wear-piece on said diaphragm, a pair of supporting strips connected to said field piece, bearings therein for said shaft, means for adjustably supporting said motor and said pair of supporting strips upon said mounting plate as a single unit and for adjusting said agitator relative to said wear-piece.

3. In a motor horn, a mounting plate, a diaphragm provided with a wear piece attached thereto, a field piece having openings and mounted in a plane parallel to the plane of said diaphragm, an armature shaft mounted at right angles to the plane of said diaphragm and carrying an agitator for contact with the wear-piece, a pair of sup-

porting strips connected to said field piece, bearings supported by said supporting strips for said shaft, supporting studs secured to said mounting plate and extending through openings in the said field piece and said supporting strips to adjustably secure the motor as a unit in position relative to said diaphragm and means coacting with said studs for adjusting said agitator and motor as a unit relative to the wear piece, said means serving to support the motor and hold the supporting strips on the field piece.

4. In a motor horn, a mounting plate, a diaphragm attached thereto, a motor for vibrating said diaphragm, a laminated field piece for said motor having openings extending therethrough, sleeve members extending through said openings and provided with enlarged end means for holding together as a unit the laminations of the field piece, and micrometric adjusting means comprising means secured to said mounting plate and extending through said sleeve members for adjustably securing said field piece to said mounting plate whereby said field piece and motor may be adjusted as a single unit relative to said diaphragm.

5. In a motor horn, a mounting plate, a diaphragm provided with a wear piece attached thereto, a motor having means for engaging said wear piece for vibrating said diaphragm, a laminated field piece for said motor openings extending therethrough, sleeve members extending through said openings and provided with enlarged end means for holding together as a unit the laminations of the field piece, and supporting studs extending through said sleeve members and provided with nuts secured to said mounting plate for adjustably holding the field piece in position relative to said mounting plate.

6. In a motor horn, a mounting plate, a diaphragm provided with a wear piece attached thereto, a motor for vibrating said diaphragm, a field piece for said motor made up of laminations provided with openings, supporting strips supporting the rotary shaft and armature of said motor, a member secured to said shaft for engaging said wear-piece to effect vibration of said diaphragm, means for securing the said supporting strips to the field piece and for holding together the laminations of the field piece and means associated with said securing means for adjustably securing said field piece and said supporting strips to said mounting plate.

7. In a motor horn, a mounting plate, a diaphragm provided with a wear piece attached thereto, a motor having an agitator secured to its shaft and adapted to engage said wear-piece for vibrating said diaphragm, a field piece for said motor made up of laminations provided with openings, supporting strips supporting the rotary shaft and armatures of said motor, means for securing the said supporting strips to the field piece and for holding together the laminations of the field piece, and supporting studs extending through orifices in said securing means and provided with nuts and connected to said mounting plate, said studs and nuts serving to adjustably hold the motor and said agitator in operative position relative to said diaphragm.

8. In a motor horn, a mounting plate, a diaphragm attached thereto, a wear-piece attached to said diaphragm and provided with a plurality of serrations or teeth, a motor provided with a shaft carrying an agitator having the same number of teeth as the wear-piece, and a commutator for said motor having the same number of segments as teeth on said wear-piece and said agitator, said commutator and agitator being operatively and adjustably positioned relatively to give the motor its maximum torque, means for supporting the motor on the mounting plate, said means providing bearing for the shaft, windings for the motor having connection with the commutator segments, and current conducting brushes carried by said means and engaged with the commutator.

9. In a motor horn, a mounting plate, a diaphragm attached thereto, a wear-piece attached to said diaphragm and provided with a plurality of serrations or teeth, a rotary motor provided with a shaft, an agitator secured to said shaft and having the same number of teeth as the wear-piece connected to said diaphragm, a commutator for said motor connected to the said shaft and having the same number of segments as teeth on said wear-piece and said agitator.

10. In a motor horn, a mounting plate having a rearwardly extending annular portion, a diaphragm provided with a wear-piece secured to said mounting plate, a rotary motor including a recessed field piece and a shaft provided with an agitator adapted to engage said wear piece for vibrating said diaphragm, a pair of supporting studs connected to and insulated from said mounting plate and fitted in the recesses of the field piece, a cover-cap for enclosing said motor mechanism adapted to fit over the said rearwardly extending annular portion, orifices in said cover-cap through which said studs extend, and means secured to said studs for holding said cover-cap in position, said studs also serving as means for supporting internal and external terminals of said device.

11. In a motor horn, a mounting plate having a rearwardly extending annular portion, a diaphragm provided with a wear-piece secured to said mounting plate, a rotary motor including a field piece with diametrically opposite recesses and a shaft provided with an agitator adapted to engage the wear piece

for vibrating said diaphragm, a pair of supporting studs connected to and insulated from said mounting plate and fitted in said recesses of the field piece, a pair of terminals secured to said mounting plate by said studs, a cover-cap for enclosing said motor mechanism adapted to fit over the said rearwardly extending annular portion, and provided with orifices through which said studs extend, means secured to said studs for holding said cover-cap in position, and connecting wires extending from said studs to said motor, the free ends of said studs forming terminals for the connection of the external electrical conductors or wires.

12. In a motor horn, a mounting plate, a diaphragm provided with a wear piece attached thereto, a motor supported by said mounting plate and having a serrated member secured to its shaft adapted to engage said wear-piece for vibrating said diaphragm, a pair of rearwardly extending studs insulatingly secured to said mounting plate, a cover-cap for enclosing said motor mechanism having orifices provided with insulatingly secured bushings adapted to receive said studs, means adapted to be secured to the said studs to hold the cover-cap in position against the mounting plate and terminals connected to the inner ends of said studs to which are connected the electrical conductors leading to the motor, the external projecting portions of said studs being adapted to receive the external electrical conductors for transmitting current to said rotary motor.

Signed by me at Chicago, in the county of Cook and State of Illinois, this 16 day of April, 1920.

WILLIAM KAISLING.