Oct. 14, 1924. 1,511,345

W. KAISLING

MOTOR HORN

Filed May 31, 1918 2 Sheets-Sheet 1

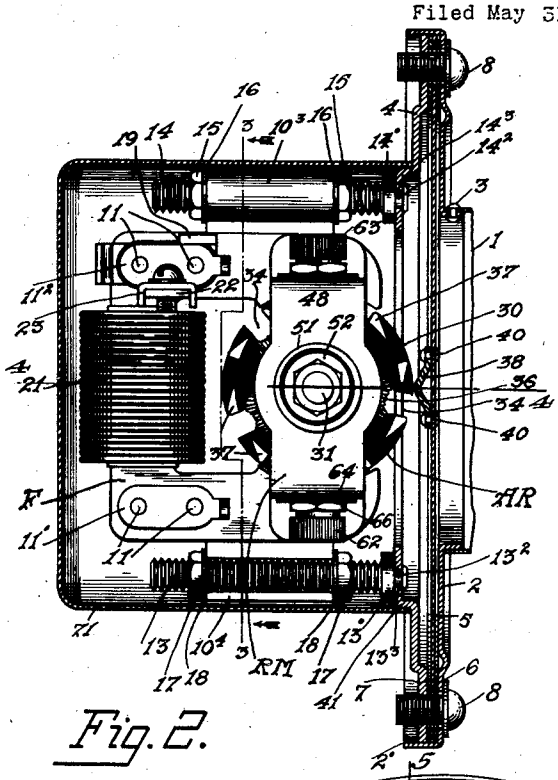

Fig. 2.

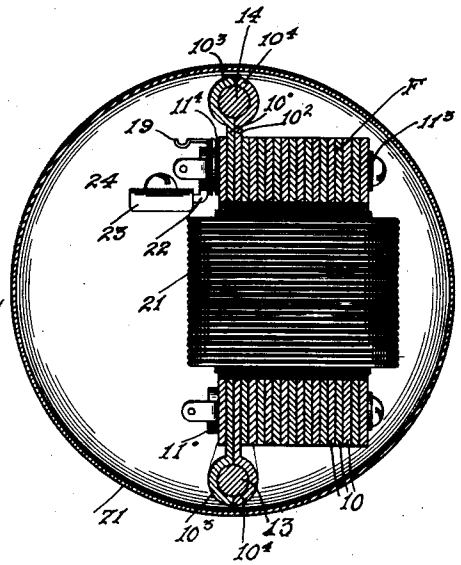

Fig. 3.

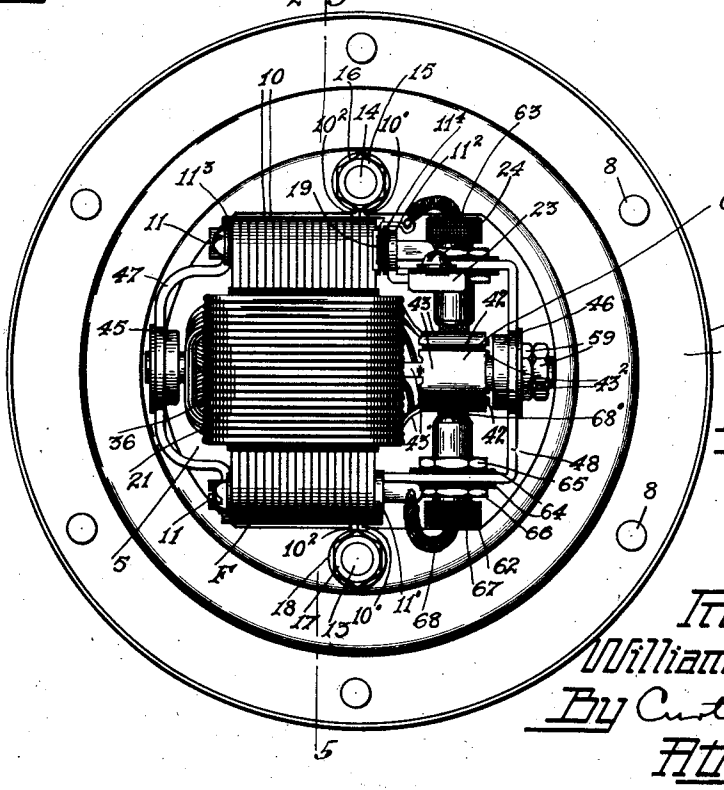

Fig. 1.

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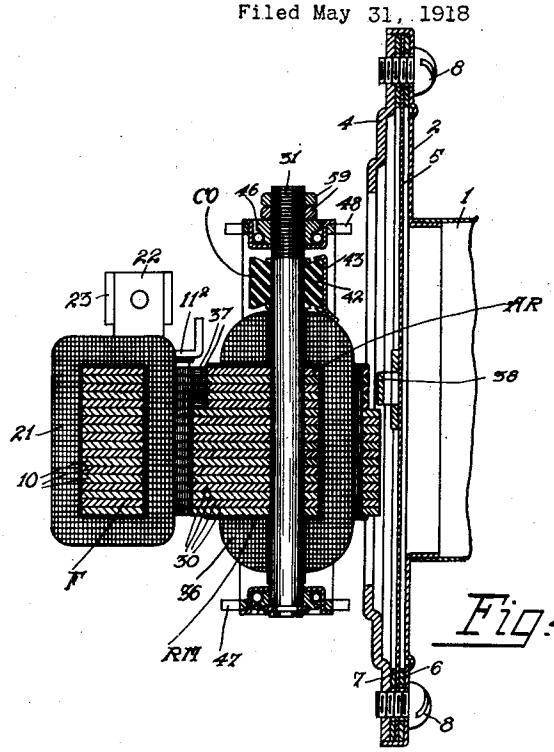

Fig. 4.

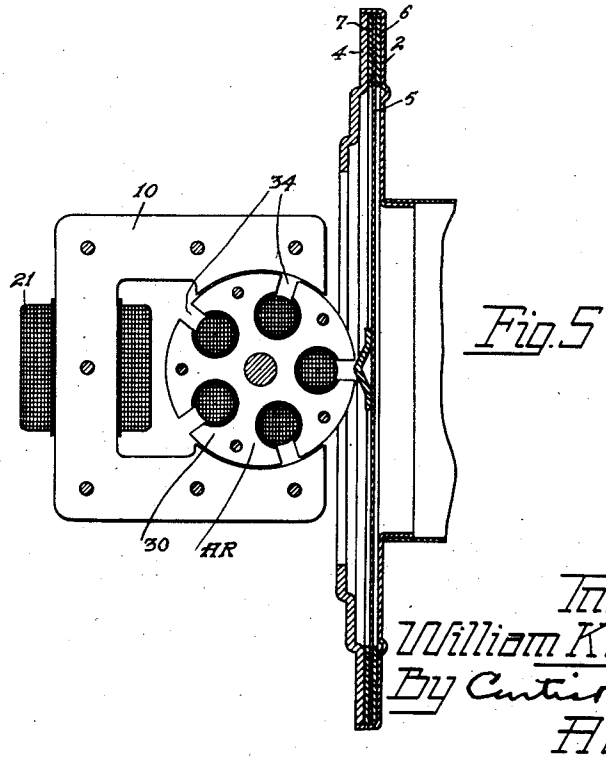

Fig. 5

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Patented Oct. 14, 1924. 1,511,345

UNITED STATES PATENT OFFICE.

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MOTOR HORN.

Application filed May 31, 1918. Serial No. 237,512.

To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States of America, residing at Chicago, in the 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 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, and its shaft is provided with a cam mounted upon it and arranged in operative relation with an impact device or anvil mounted upon the rear face of the diaphragm. The motor is small and compact in construction and consumes but little current and may be operated from a low voltage storage battery which is now almost universally used in conjunction with the ignition system of an automobile engine.

A feature of my invention is the provision of means for micrometrically adjusting the rotary motor relative to the anvil or contact device which the serrated portion of the armature, or agitator, contacts with. Two of the laminations of the field piece of the motor are provided with projecting ears that are formed into circular tubes through which a pair of threaded studs pass. Nuts are provided for the threaded studs for moving the motor as a unit away from or towards the diaphragm and anvil thereby regulating the contact of the agitator with the anvil of the diaphragm.

Another feature of my invention is the construction of the armature of the motor, the said armature being of laminated construction and having part of its laminations serrated or provided with teeth which form the cam for engaging the contact device or anvil mounted upon the diaphragm. The portion of the armature that is provided with serrations or teeth forms a part of the armature through which the flux traverses when passing from one pole piece to the other pole piece of the field of the motor. By constructing the cam of the motor as part of the armature of the motor, I am able to provide a wider armature and field piece for the same sized motor than I otherwise would be able to provide if it were necessary to extend the cam of the motor past or at the outside of the field piece of the motor. By this arrangement, I am also able to mount the motor concentrically with respect to the diaphragm. The successive engagement of the anvil by the teeth of the cam causes the diaphragm to vibrate to emit a sound through the resonator.

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

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

Fig. 1 is a rear elevation of the signaling horn embodying my invention shown with the rear cap or cover removed;

Fig. 2 is a left side elevation of Fig. 1 with certain parts shown in section;

Fig. 3 is a sectional view taken along line 3—3 of Fig. 2.

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 2, and

Fig. 5 is a sectional view along the line 5—5 of Fig. 1.

Referring now more in detail to the device as illustrated, it comprises a resonating or reverberating horn 1 (only a part of which is shown) suitably secured to the front plate 2 in any suitable manner, as by means of rivets 3. A mounting frame 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 placed within the cup-shaped portion 2′ of 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 frame 4. The front plate 2, diaphragm 5, packing rings 6 and 7, and mounting frame 4 are then securely clamped together by means of bolts 8, thus circum-

ferentially engaging and clamping the diaphragm in place between frame 4 and front plate 2.

Referring now to the small rotary motor RM, it comprises a U-shaped field piece F built up of a plurality of U-shaped laminations 10 suitably held together by means of bolts 11 which pass through the laminations and have screw-threaded engagement with the terminal clips 11′ and 11^2. The terminal clip 11′ is electrically connected with the field piece of the motor, but the terminal clip 11^2 is insulated from the field of the motor by means of pieces of fiber 11^3 and 11^4. The laminations 10′ and 10^2 of the U-shaped field piece are provided with integrally formed extended portions 10^3 and 10^4, respectively by which the U-shaped field piece F is adjustably secured to the threaded studs 13 and 14. The extended portions 10^3 and 10^4 of the laminations 10′ and 10^2 extend from each side of the field piece F and are so formed as to provide a cylindrical tube at each side of the field piece F through which the posts 13 and 14 extend.

The posts 13 and 14 are each provided with a shoulder, 13′ and 14′, respectively, and also with a reduced portion, 13^2 and 14^2, respectively, which reduced portions extend through orifices 13^3 and 14^3 in the plate 4. The reduced portions of the posts 13 and 14 are then riveted over to secure said posts to the frame 4. The post 14 is provided with a pair of nuts 15 and with washers 16. Likewise, the post 13 is provided with a pair of nuts 17 and washers 18. To micrometrically adjust the motor as a unit relative to the anvil on the diaphragm, it is only necessary to loosen the nuts 17 and 15 and to then turn them to the right or left, depending upon whether it is desired to move the motor away from or towards the diaphragm. The rear nuts are then tightened to securely hold the motor in adjusted position. A field coil 21 is suitably wound upon the U-shaped field piece F and the terminals of the winding are connected to the terminals 11^2 and 19 which are secured to the field piece F. The terminals 19 and 11^2 are each insulatingly mounted upon the field piece F, are insulated from each other, and, as mentioned before, they are secured to the field piece F by means of the rivets 11. The terminal 11^2 has a right angle extension 22 which is provided with a U-shaped clamping member 23, held in place by means of a screw 24, which has screw-threaded engagement with the said extension 22 and serves as a binding post or one of the leads that connects to the circuit closer or battery. The terminal 11′ which is conductively secured to the field piece by means of bolts 11 is electrically connected to the other brush of the motor.

A laminated armature AR for the motor is centrally positioned between the pole pieces of the U-shaped field piece F, the said armature being built up of a plurality of disks 30 which are fitted upon the shaft 31 in any suitable manner, as by means of a drive fit. The laminations are held together by means of rivets. The armature has a plurality of circular slotted orifices 34 extending lengthwise of the armature. The windings 36 of the armature are contained in these orifices and the terminals of these windings are led to the terminals of the commutator CO. The ends of the armature are flush with the outside laminations of the field piece F, that is, the armature is substantially of the same width as the field piece F. Four or five laminations of the armature comprising the laminations nearest the commutator CO serve the purpose of a cam, said laminations being provided with a plurality of teeth 37 which engage the anvil 38 mounted upon the diaphragm 5 when the armature is rotated.

The anvil 38 is formed out of a circular disk and has a V-shaped portion pressed out and hardened for engagement with the teeth of the cam. The anvil 38 is suitably fastened to the center of the diaphragm by means of rivets 40. The commutator CO is suitably mounted upon the shaft 31 by means of a drive fit, and it comprises a core of insulating material having its periphery provided with a plurality of ridges or ribs 42 which form separators for the segments 43 of the commutator CO. The segments 43 are shaped to conform with the periphery of the core and are of a width to fit between the ribs 42. The segments 43 are provided with terminal clips 43′, preferably formed integrally therewith and to which the windings of the armature are attached. The segments 43 are secured to the core by means of clamps 43^2 which are turned over the edge of the core. I rotatably support the motor shaft 31 and its parts as a whole in bearings 45 and 46 which are located in the bridge plates 47 and 48, the said bridge plates being suitably secured to the field piece F by means of screws. The bearings that rotatably support the shaft 31 are of the well known ball bearing type, comprising the usual ball race or cup 51, cone 52 and ball bearings. The end 54 of the shaft 31 has a groove (not shown) into which a split collar is placed, said collar fitting in a suitable countersunk portion in the cone of the bearing 45.

The other end of the shaft is threaded, and provided with a pair of nuts 59 for holding the shaft and motor in position.

The motor brush holders 62 and 63 are suitably supported in the bridge plate 48. Each brush comprises a shell fitting into an opening in the bridge plate but insulated therefrom by means of washers of insulating material 64. The brush shell is provided with a hexagonal shoulder 65 which

rests against one of the washers 64 and the other end of the brush shell is threaded to receive a hexagonal nut 66 which turns up against the other washer 64, thereby securely holding the brush shell in position. Threaded onto the threaded extremity of the brush shell 62 is a knurled cap 67 which is provided with an opening through which the cord 68 which extends to the terminal 11' passes. The brush 68' is made of any suitable material, as copper wire gauze, rolled to form a brush of a size to fit into the orifice that extends into the shell 62. The lead which connects the brush to the terminal 11' is soldered to the wire gauze brush. A coiled spring (not shown) retains the brush firmly against the commutator, one end of the coiled spring resting against the cap 67 and the other end against the brush. To remove the brush, it is only necessary to unscrew the knurled cap 67 and to pull out the coiled spring and the brush. The brush 63 is similar in all respects to the brush 62. A suitable enclosing casing 71 is provided, which fits over the flanged portion 41 of the frame 4 and is suitably held in position by means of screws (not shown). In assembling the horn and attuning it, the nuts 17 and 15 are adjusted as previously described to permit the entire motor to be moved along the posts 13 and 14 toward or from the diaphragm.

While the invention has been described with particular reference to the details of construction, it should 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 which 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:

1. A device of the character described including a diaphragm, a rotary motor provided with a field piece having two pole pieces, a cylindrical armature for said motor, teeth for said armature for actuating said diaphragm, the circumference of the part of the armature containing the said teeth being the same as the circumference of the remaining part of the cylindrical armature, said cylindrical armature and teeth being situated in a position to connect the pole pieces of said field piece by the shortest magnetic path.

2. A device of the character described including a diaphragm, a rotary motor provided with a field piece having two pole pieces, a cylindrical armature for said motor, teeth for said armature for actuating said diaphragm, the circumference of the part of the armature containing the teeth being no greater than the circumference of the remaining part of the armature, said cylindrical armature and teeth being situated in a position to connect the pole piece of said field piece by the shortest magnetic path.

3. A signalling device, including a motor, a laminated field piece therefor, part of the laminations being extended in opposite directions and provided with openings, a mounting member for said motor, threaded studs carried by the mounting member and engaged with said openings for adjustably securing the motor to said mounting member.

4. In a signalling device, a diaphragm, a motor including a rotary armature, a field piece having its poles arranged to receive said armature, means carried at one side of said armature and encompassed within the poles of the field piece for vibrating said diaphragm, and means for adjusting said motor with respect to the diaphragm.

5. In a signalling device, a diaphragm having a central wear piece, a motor including a rotary laminated armature, a field piece having its poles arranged to receive said armature, certain of the laminations of the armature, to one side of its longitudinal center being formed to produce wear piece engaging elements, said engaging elements being encompassed within said poles, a mounting device, and means for supporting the motor with the engaging elements in contact with the wear piece.

6. In a signalling device, a diaphragm having a wear piece, a motor including a shaft having a serrated member cooperating with the wear piece to vibrate the diaphragm, a field piece provided with oppositely extended laminæ having openings, a mounting plate, parallel members carried thereby and engaged in said openings of the field piece for permitting bodily adjustment of the motor toward and away from the diaphragm.

7. A motor horn comprising a diaphragm carrying a wear piece, a motor including a shaft having a serrated cam for cooperating with said wear piece and a field piece provided with oppositely disposed openings, a mounting plate, studs carried thereby and projecting through said openings, and means on said studs for adjusting the motor bodily toward and away from the diaphragm.

8. A signaling device of the character described including a mounting member, a rotary motor provided with a laminated field piece, part of the laminations of said field piece being extended and formed into cylindrical tubes, screw-threaded members secured to said mounting member and passing through said tubes, and nuts adapted to be threaded onto said screw threaded members for adjustably securing said motor to said mounting member.

9. A signaling device of the character described including a mounting member, a

diaphragm attached to said mounting member, a rotary motor provided with means for vibrating said diaphragm, a laminated field piece for said rotary motor, part of the laminations of the field piece being extended and formed into cylindrical tubes, studs secured to said mounting member and extending through said cylindrical tubes, and means for adjusting the said motor relative to said diaphragm by moving the same toward or away from said diaphragm along said studs.

Signed by me at Chicago, in the county of Cook and State of Illinois, this 28th day of May, 1918.

WILLIAM KAISLING.