W. KAISLING.

SIGNALING DEVICE.

APPLICATION FILED MAY 8, 1916.

1,323,696.

Patented Dec. 2, 1919.

2 SHEETS—SHEET 1.

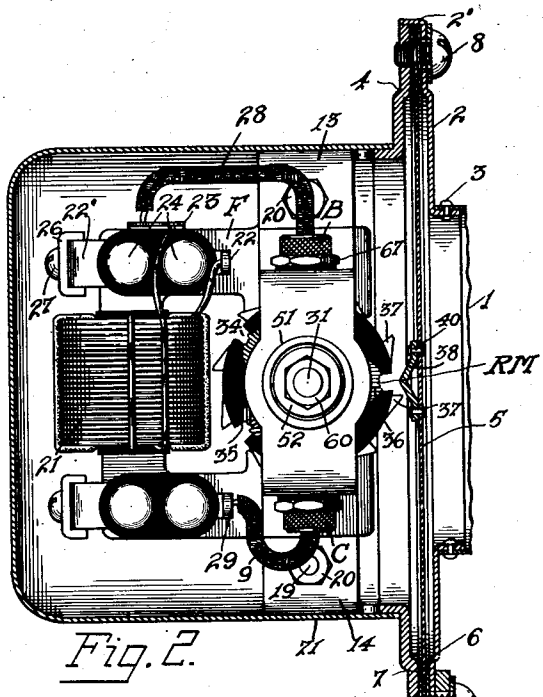


Fig. 2.

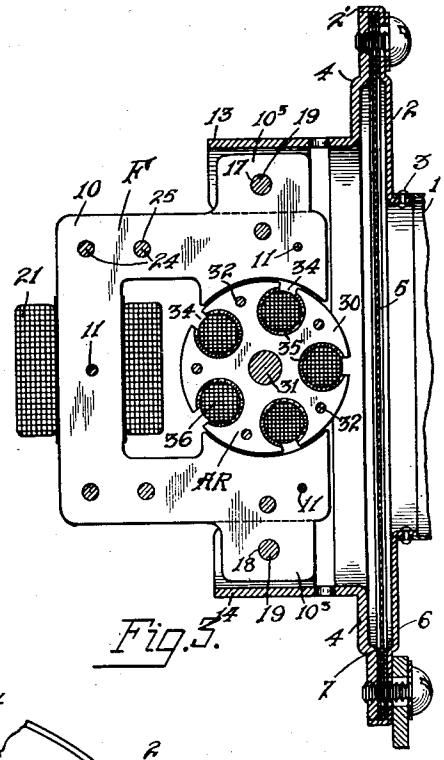


Fig. 3.

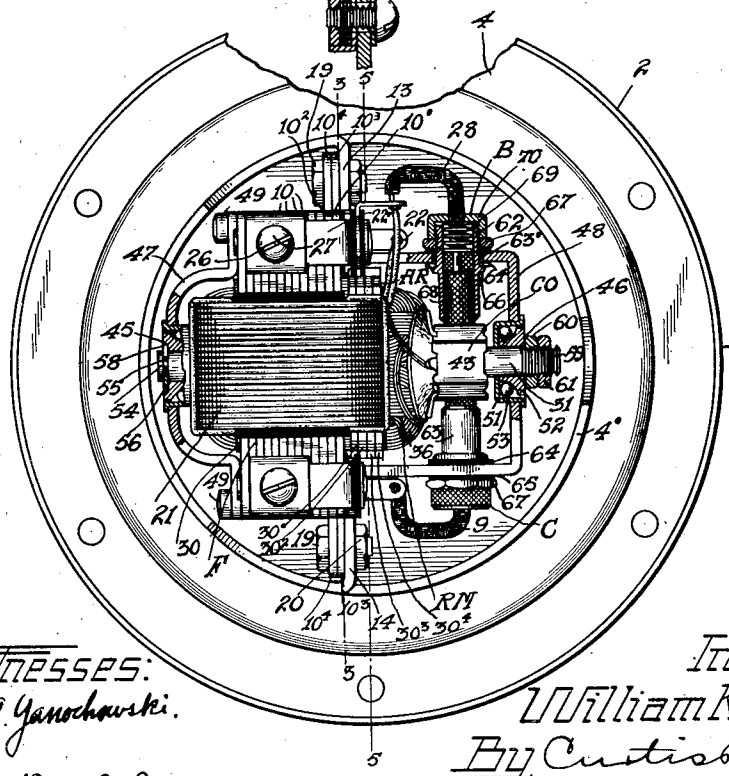


Fig. 1

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2 SHEETS—SHEET 2.

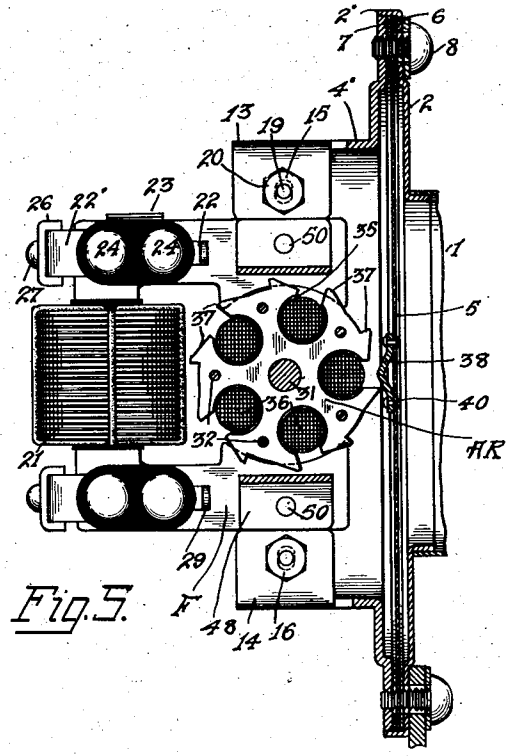


Fig. 5.

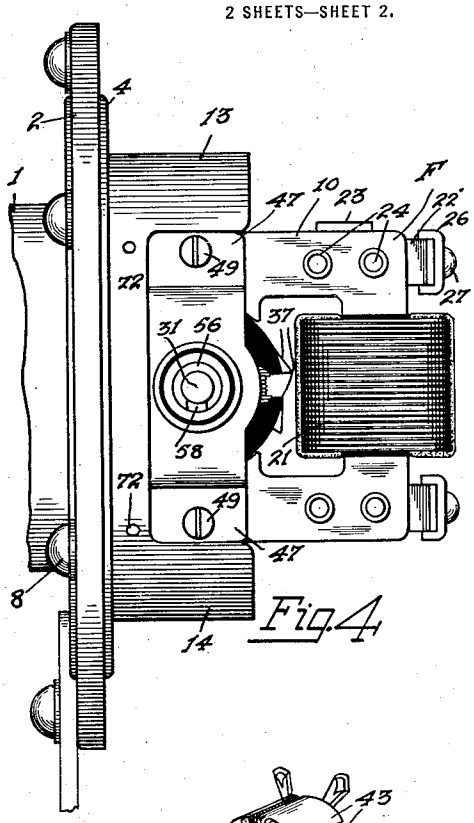


Fig. 4.

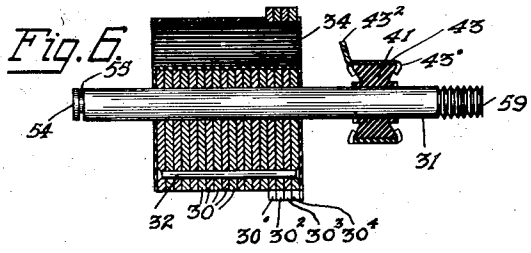


Fig. 6.

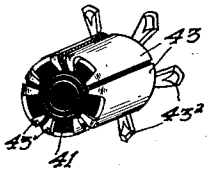


Fig. 7.

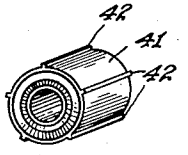


Fig. 8.

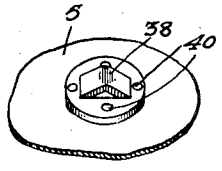


Fig. 10.

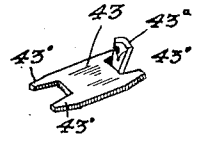


Fig. 9.

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# UNITED STATES PATENT OFFICE.

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

## SIGNALING DEVICE.

1,323,696. Specification of Letters Patent. Patented Dec. 2, 1919.

Application filed May 8, 1916. Serial No. 96,136.

*To all whom it may concern:*

Be it known that I, WILLIAM KAISLING, a citizen of the United States of America, residing in Chicago, county of Cook, State of Illinois, have invented certain new and useful Improvements in Signaling Devices, 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 signals on automobiles, launches 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 inclosing 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 construction of the motor and its parts and the arrangement of the armature upon the motor shaft, the said armature being of laminated construction and having part of its laminations provided with projections or teeth which form the cam for engagement with the impact device or anvil mounted upon 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 serrated impact cam, as stated, is formed integrally with the armature, thus permitting the motor to be mounted concentrically with the impact button upon the diaphragm.

Another feature of my invention is the construction of the commutator, the segments of the same being formed so that they may be spaced around the periphery of a suitable insulating core provided with ribs and held in place upon the core by reason of clips formed integral with the segments, said segments being thus held in place without any additional fastening means such as screws or dowel pins.

Still another feature of my invention is a novel and improved form of brush and brush holder for the small rotary motor. The horn of my invention is simple in construction, efficient in its operation, low in current consumption and compact in its arrangement of parts, all of which parts are readily accessible for adjustment.

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

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

Figure 1 is a rear elevation of the signaling horn embodying my invention, shown with the rear cap removed;

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

Fig. 3 is a sectional view along line 3—3 of Fig. 1;

Fig. 4 is a left side elevation of Fig. 1;

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

Fig. 6 is a sectional view of the motor shaft and the parts carried thereby;

Fig. 7 is a perspective view of the commutator;

Fig. 8 is a perspective view of the insulating core of the commutator;

Fig. 9 is a perspective view of one of the commutator segments; and

Fig. 10 is a perspective view of the impact button or wear piece carried by the diaphragm of the device of my invention.

Referring now more in detail to the device as illustrated, it comprises a resonating or reverberating horn 1 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 $2^1$ 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 circumferentially 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 plate F built up of a plurality of U-shaped laminations 10 suitably riveted together by means of rivets 11. The laminations $10^1$ and $10^2$ of the U-shaped field piece are provided with integrally formed extending ears $10^3$ and $10^4$ by which the U-shaped field piece F is fastened to the mounting frame 4. The mounting frame 4 has ears 13 and 14 struck up from it at right angles to a tangential line to the said frame at the point that they are struck up, said ears having suitable openings 15 and 16 as shown dotted in Fig. 5. The ears $10^3$ and $10^4$ of the laminations $10^1$ and $10^2$ are provided with suitable openings 17 and 18, and to mount the said U-shaped field piece F as a whole, bolts 19 are passed through the openings 17 and 18 in the ears $10^3$ and $10^4$ of the laminations $10^1$ and $10^2$ and through the openings 15 and 16 in the ears 13 and 14 of the frame 4. Nuts 20 are provided which have screw threaded engagement with bolts 19 to securely hold the U-shaped field piece F in position upon the frame. Openings 15 and 16 in the ears 13 and 14 are slightly oblong in shape thus permitting adjustment of the motor RM as will be presently described. A field coil 21 is suitably wound upon the U-shaped field piece F and the terminals of the winding 21 are connected to suitable terminals mounted upon the field piece F. The terminals 22, 23 are insulatingly mounted upon the field piece F and are insulated from each other and permanently secured by means of the rivets 24, which pass through suitable openings 25, to the field piece F. The terminal 23 serves as one terminal for the field winding 21 and terminal 22 serves as the other terminal for the winding 21. The terminal 22 has a right angled extension $22^1$ which is provided with a U-shaped clamping member 26 held in place by means of a screw 27 which has screw threaded engagement with the said extension $22^1$ and serves as a binding post for one of the out leads that connect to the circuit closer or battery. The terminal 23 also has a connection 28 extending from it to the brush B. A terminal 29 is also insulatingly mounted upon one leg of the U-shaped field piece F being similar to the terminal 22 just described and fastened in a similar manner. The terminal 29 also has a binding post arranged as that of 22 and serves as a terminal for the other external lead. The terminal 29 has a conductor 9 extending from the said terminal to the brush C 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 as a unit AR by means of rivets 32. The armature has a plurality of circular slotted orifices 34 extending lengthwise of the armature and into which split sleeves of insulation 35 are fastened. The windings 36 of the armature are contained in these insulated orifices, and the terminals of these windings are led to the terminals of the commutator CO as will be more fully hereinafter described.

Four laminations of the armature, laminations $30^1$, $30^2$, $30^3$, $30^4$, 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 an insulating core 41 having its periphery provided with a plurality of ridges or ribs 42 which form separators for the commutator 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 ridges 42. The segments 43 are provided with clips $43^1$ preferably formed integral therewith, and when the segments are placed on the periphery of the core they are secured thereto by means of the said clips $43^1$ which are turned over the edge of the core, (most clearly illustrated in Fig. 7,) thus securely holding them upon the core against displacement. Each segment 43 is provided with a terminal $43^2$ preferably formed integral with the said segment and forms a terminal for the windings of the motor armature. I rotatably support the motor shaft 31 and its parts as a whole in bearings 45, 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 the screws 49, 50. 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 53. The end 54 of the shaft 31 has a groove 55 into which a split collar 56 is placed, said collar fitting in a suitable countersunk portion 58 in the cone 52 of the bearing 45. The other end 59 of the shaft 31 is threaded, and immediately below the threaded portion the usual cone 52 is placed, this said end 59 of the shaft being supported by a bearing in the bridge plate 48 similar to that of bearing 46 just described. Now when the shaft 31 has been placed as shown in Fig. 1 with the collar in place in groove 55 of the shaft 31 and the end 59 is in the bearing 46 an adjusting nut 60, having screw threaded engagement with the portion 59 of the shaft 31, is

threaded upon the shaft and when proper adjustment of the shaft is obtained, that is, adjustment against longitudinal movement, a lock nut 61 having screw threaded engagement with the threaded portion 59 of the shaft 31 locks the shaft in its adjusted position.

The motor brush holders 62 and 63 are suitably supported in the bridge plate 48. The brush B comprises a shell 62 fitting into a suitable opening $63^1$ in the bridge plate but insulated therefrom by means of the insulating bushing 64 and the insulating washer 65, a shoulder 66 is formed upon the shell 62 which bears against bushing 64. A nut 67 which has screw threaded engagement with the threaded portion of the shell 62 is screwed upon shell 62 to securely hold the shell 62 in place, but is insulated from the bridge plate 48 by the washer 65. The brush 68 is made of any suitable material as copper wire gauze rolled to form a brush of a size to fit in the shell 62. The lead to the brush 68 is placed in a suitable opening in the rolled wire gauze and then soldered thereto. To place the proper bearing pressure of the brush 68 against the commutator CO, I provide a coil spring 69 which is placed in the shell 62 above the brush 68. The cap 70 has screw threaded engagement with the threaded end of the shell 62 and when screwed upon the shell 62 places the spring under tension to place the proper bearing pressure upon the brush 68 which is in engagement with the commutator CO. A suitable inclosing casing 71 is provided which fits over the flanged portion $4^1$ of the frame 4 and is held in place by means of suitable screws which have screw threaded engagement with suitable tapped holes 72 in the flanged portion of the mounting frame 4.

In assembling the horn and attuning it, the screws 19 are released slightly so as to permit the entire motor to slide along the lugs 13 and 14 toward or from the diaphragm, and when the desired tone has been developed, said screws may be set to lock the motor in adjusted position.

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.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. A signal device of the character described having a vibrating member, a rotary motor operatively associated with said member and provided with a laminated armature, certain of said laminations being formed with teeth for engaging and vibrating said member.

2. In a signaling device, the combination with a vibrating member, of a motor provided with a rotary armature, a plurality of sheets of metal forming said armature, certain of said sheets of metal being serrated to form engaging means to actuate the said vibrating member.

3. A signaling device including a diaphragm, a resonator therefor, a motor provided with a rotary armature, said rotary armature comprising a plurality of sheets of metal secured together to form a unit, a plurality of said sheets of metal being formed with teeth to engage and vibrate said diaphragm whereby a sound is caused to emanate from said resonator.

4. An alarm or signal apparatus having a sound producing member, and a motor having a rotary armature composed of a plurality of comparatively thin sheets of metal, certain of said sheets of metal nearest one extremity of said armature being formed with teeth to form engaging means to vibrate the said sound producing member.

5. A signaling device including a diaphragm, a rotary member provided with a laminated armature, certain of said laminations being serrated to engage and vibrate said diaphragm thereby causing said diaphragm to emit a sound.

6. A signaling device of the character described including a vibratory member, a motor associated with said member and provided with a laminated armature, part of the laminations of said armature having their outer periphery provided with integrally formed serrated teeth for engaging and actuating said vibratory member.

7. A device of the character described including a diaphragm, a motor for vibrating said diaphragm having a magnetic field piece built up of a number of laminations, part of said laminations being provided with integrally formed ears which form mounting means for the said field piece, and a laminated armature for said motor provided with serrated teeth.

8. A signaling device of the character described including a rotary motor, a field piece for said motor comprising a plurality of comparatively thin sheets of metal, part of said sheets of metal being provided with integrally formed ears forming mounting means for said motor.

9. A device of the character described including a diaphragm, a mounting member provided with dependent ears, a rotary motor provided with a field piece made up of a plurality of laminations, part of said laminations being provided with extended ears, said extended means being adapted to be secured to said dependent ears to hold the motor in position, an armature for said

motor provided with teeth for engagement with said diaphragm.

10. A device of the character described including a diaphragm, a mounting member provided with inwardly turned supporting ears, a motor provided with a laminated field piece, certain of the laminations of said field piece being extended to form mounting means to secure said motor to said inwardly turned ears, a laminated armature for said motor adapted to vibrate said diaphragm.

11. A device of the character described including a diaphragm, a motor for vibrating said diaphragm, a laminated armature and a laminated field piece for said motor, part of the laminations of said armature being provided with engaging means for causing the vibrations of said diaphragm, and a part of the laminations of said field piece forming mounting means for said motor.

12. A signaling device of the character described including a diaphragm, a motor for vibrating said diaphragm, a laminated armature for said motor, a laminated field piece for said motor, certain of the laminations of said armature being provided with teeth for engaging said diaphragm, and certain of the laminations of said field piece being provided with extended ears for mounting said motor.

13. A signaling device of the character described including a diaphragm, a motor provided with a rotary armature comprising a plurality of sheets of metal, a field piece for said motor also comprising a plurality of sheets of metal, certain of the sheets of metal of said armature being serrated to form engaging means to vibrate said diaphragm, and certain of the sheets of metal of said field piece being extended to form mounting means for securing said rotary motor in its position relative to said diaphragm.

14. A device of the character described including a mounting member provided with inwardly turned mounting means, a diaphragm secured to said mounting member, a motor provided with a field piece having projecting ears for securing said motor to said inwardly turned means, and a laminated rotary armature for said motor having integrally formed teeth for engagement with said diaphragm.

15. In an automobile horn, the combination of a diaphragm, an electric motor provided with a field piece, a rotary shaft for said motor, a laminated armature and a commutator on said shaft, part of the laminations of said armature forming vibrating means for said diaphragm and being located between the commutator and the field piece of said motor.

16. A device of the character described including a diaphragm, a mounting member to which said diaphragm is secured, integrally formed inwardly turned ears for said mounting member, a motor for vibrating said diaphragm provided with a laminated field piece, certain of the laminations of said field piece being provided with projected ears forming securing means whereby said motor may be adjustably secured to the inwardly turned ears of said mounting member.

17. A device of the character described including a mounting ring provided with integrally formed mounting members, a diaphragm peripherally secured to said mounting ring, an electric motor provided with a laminated field piece, certain of the laminations of said field piece being provided with integrally formed ears whereby said motor may be secured to the integrally formed mounting members of said mounting member, and means operated by said motor for vibrating said diaphragm.

18. In a warning device, the combination of a diaphragm, an anvil on said diaphragm, an electric motor provided with a shaft, a field piece and a commutator for said motor, a laminated armature for said motor, part of the laminations of said armature being provided with teeth for engaging said anvil and vibrating said diaphragm, the laminations carrying said teeth being located between said field piece and said commutator.

19. In an automobile horn the combination of a diaphragm, an electric motor provided with a field piece, a shaft for said motor carrying a laminated rotary armature and a commutator, part of the laminations of said armature being provided with teeth for engaging said diaphragm, the said teeth being located between said field piece and said commutator.

20. A device of the character described including a diaphragm, a rotary motor provided with a field piece, a rotary shaft for said motor carrying a laminated armature and a commutator, part of the laminations of said armature being provided with integrally formed teeth for engaging said diaphragm, said teeth being located between the field piece and the commutator of said motor.

21. A device of the character described including a vibrating medium, and a motor having a rotary armature, a portion of the body of the armature being provided with integrally formed teeth for directly contacting with said vibrating medium.

22. A device of the character described, including a diaphragm, a motor having a laminated armature, part of the laminations having teeth adapted to engage and vibrate said diaphragm.

23. A signaling device of the character described having a vibrating member, a motor having a rotary armature formed of a

plurality of sheets of metal, certain of said laminations being formed with teeth for engaging and vibrating said member, and a longitudinal orifice in said armature adapted to receive the armature winding.

24. A signaling device of the character described having a vibrating member, a motor having a rotary armature formed of a plurality of sheets of metal, certain of said laminations being formed with teeth for engaging and vibrating said member, and a longitudinal orifice in said armature adapted to receive the armature winding, said winding extending around the armature laminations having teeth.

25. In an automobile horn, the combination of a diaphragm, an electric motor provided with a field piece, a rotary shaft for said motor, an armature and commutator upon said shaft, said armature being provided with integrally formed teeth for vibrating said diaphragm, said teeth being located between the commutator and field piece of said motor.

26. A signaling device of the character described having a vibratory member, a motor having a rotary armature provided with integrally formed teeth for engaging and vibrating said member, and an orifice in said armature adapted to receive the armature winding.

27. A signaling device of the character described including a vibratory member, a motor associated with said member and provided with a rotary armature, said rotary armature having integrally formed serrated teeth for engaging and actuating said vibratory member.

28. A signaling device including a diaphragm, a rotary motor associated therewith and provided with a rotary armature, said armature being provided with integrally formed serrations for engaging and vibrating said diaphragm thereby causing said diaphragm to emit a sound.

Signed at Chicago, in the county of Cook and State of Illinois by me in the presence of two witnesses.

WILLIAM KAISLING.

Witnesses:
G. A. YANOCHOWSKI,
M. R. ROCHFORD.