

Oct. 5, 1937.

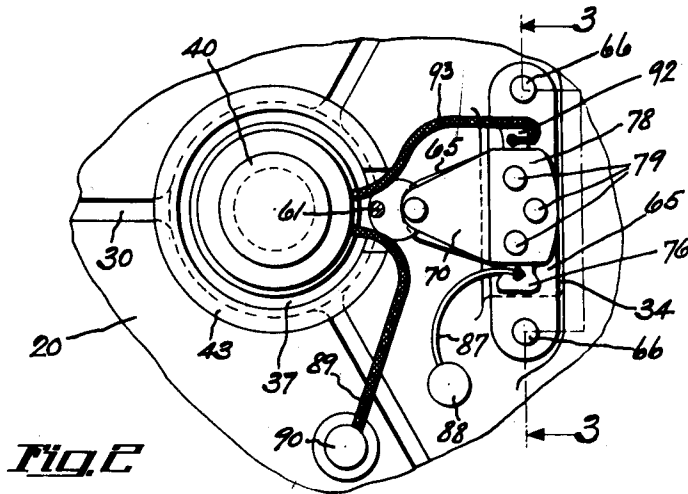
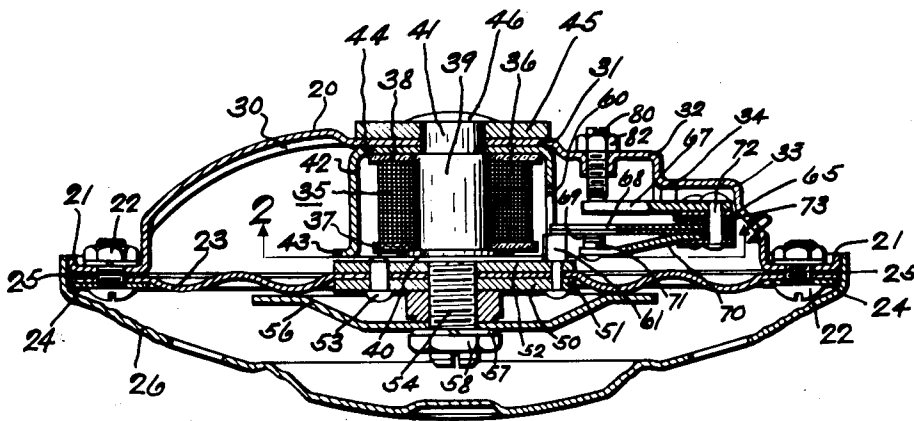
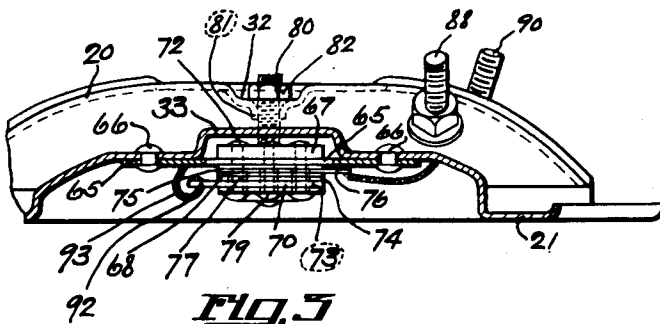
R. M. CRITCHFIELD

2,094,772

SOUND SIGNAL

Filed May 5, 1934

2 Sheets-Sheet 1



INVENTOR
Robert M. Critchfield
BY
Spencer, Hardman & Fitch
ATTORNEY

Oct. 5, 1937.

R. M. CRITCHFIELD

2,094,772

SOUND SIGNAL

Filed May 5, 1934

2 Sheets-Sheet 2

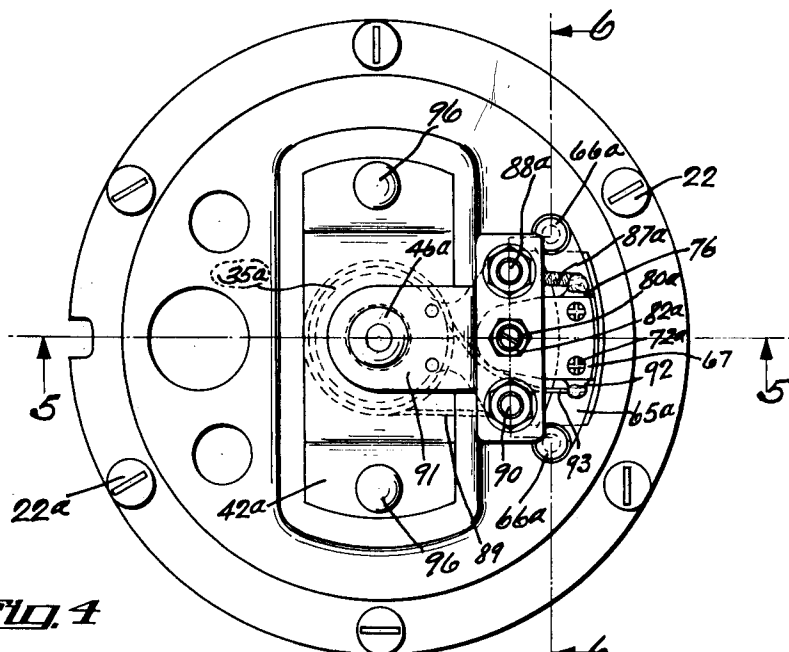


FIG. 4

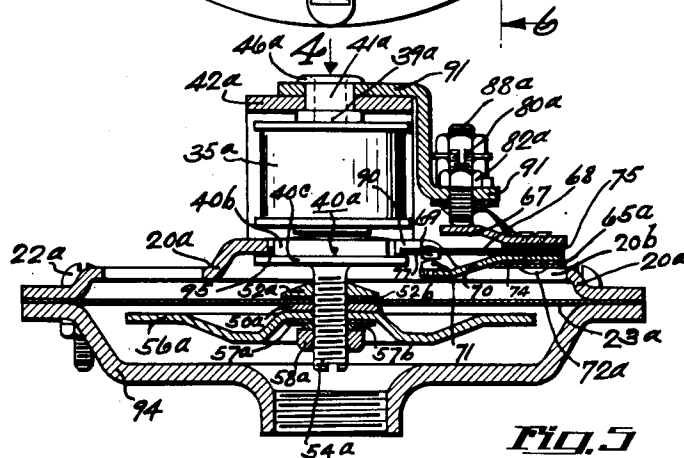


FIG. 5

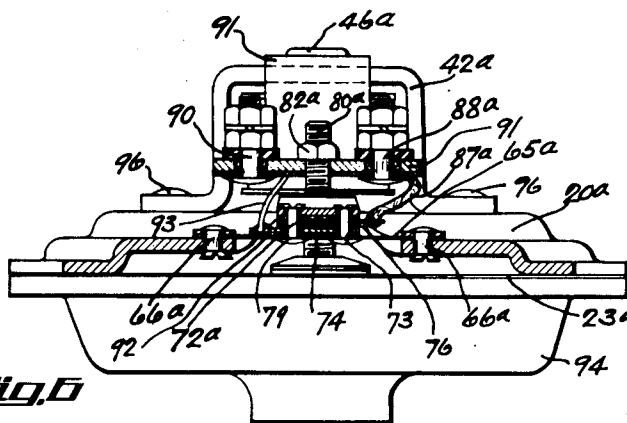


FIG. 6

INVENTOR,
Robert M. Critchfield
BY
S. Pomeroy, Hardman & Pich,
ATTORNEY

UNITED STATES PATENT OFFICE

2,094,772

SOUND SIGNAL

Robert M. Critchfield, Anderson, Ind., assignor
to General Motors Corporation, Detroit, Mich.,
a corporation of Delaware

Application May 5, 1934, Serial No. 724,011

2 Claims. (Cl. 177-7)

This invention relates to sound signals of the vibrator type and is particularly directed to that form of such signal device disclosed in my copending application S. N. 416,378, filed December 26, 1929, of which this is in part a continuation.

It is among the objects of the instant invention to provide a sound signal of the class described that will be simple in construction and capable of ready adjustment whenever occasion may demand.

It is a further object of the invention to improve magnet motors used for operation of sound signals of the class described.

A further object of the invention is to simplify structures of the class described particularly the circuit breaker mechanism controlling the circuits by which the motor of the sound signal device is operated.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a cross sectional view of a sound signal involving the present invention.

Fig. 2 is a detail in plan view of a contact breaker assembly according to the present invention and is taken substantially as indicated by the line and arrows 2-2 of Fig. 1.

Fig. 3 is a sectional view through the contact breaker assembly as indicated by the line and arrows 3-3 of Fig. 2.

Fig. 4 is a rear elevational view of a modified form of a sound signal device, it being a view substantially as indicated by arrow 4 of Fig. 5.

Fig. 5 is a sectional view taken substantially as indicated by the line and arrows 5-5 of Fig. 4.

Fig. 6 is a view partly in section substantially as indicated by the line and arrows 6-6 of Fig. 4.

With particular reference to the drawings, 20 indicates a horn back of rigid cupped formation, as appears in Figs. 1 to 3 inclusive, and provides an attaching flange 21 peripherally apertured to receive bolt and nut devices 22 which cooperate to firmly secure a diaphragm 23 between the flange 21 and a clamping ring 24, a gasket 25 being inserted between the said flange and diaphragm. In practice, six or eight of these clamping means are provided for securing the diaphragm to the back member, and alternating ones of the same also operate to secure a face plate or grill work 26 to the structure, substan-

tially as illustrated in my copending application herein above referred to.

It is desired that the back member 20 of the horn be of relatively rigid construction, and it is, therefore, provided with the radial ribs 30 which reduce the possibility of flexing or dishing, and the back member is also provided with other deformations as 31, 32, 33 and 34, that in addition to other functions, each tends to rigidify the said back member. By reference to Figs. 1, 2 and 3 it will be observed that the member 20 approaches the parabolic form, but at the axis thereof the deformation 31 takes up a planar portion which provides means for mounting an electromagnet 35 within the casing.

The electromagnet in main comprises a winding 36 confined between two dielectric heads 37 and 38 and disposed about a headed core member 39. The core 39 includes a thin headed portion 40 disposed against the head member 37 of the winding and also a reduced portion 41 which aids in attaching the magnet to the horn back 20. A coil cup 42 substantially of cylindrical formation providing a peripheral flange 43 and a planar bottom 44, is apertured to receive the reduced portion 41 of the core member. The central deformation 31 of the horn back is centrally apertured, within which aperture is disposed the reduced portion 41 of the core as illustrated in Fig. 1, and that is peened over against a reinforcing plate or washer 45 as at 46. Thus the magnet motor 35, coil cup 42 and horn back 20 are rigidly secured together by the core of the magnet, the reinforcing member 45 eliminating any flexing of the member 20 that might occur between the terminus of the ribs 30 and the attachment of the core. The face 40 of the core is substantially in the same plane as the face 43 of the coil cup, and forms the usual pole pieces of the magnet device.

The diaphragm 23 is affixed to the back of the sound signal device and at the central portion thereof supports an armature 50 which is composed of similar discs 51 and 52, one being disposed on either side of the diaphragm 23 at the central area thereof substantially as illustrated, and retained in clamping engagement therewith by rivets 53. This places the armature in overlying relation with respect to the flange 43 of the coil cup and also centrally disposes it over the head 40 of the core, thus completing the magnetic circuit through the device.

At a central point, and coaxial with the core 39, the armature members 51 and 52, and the diaphragm 23 are apertured to receive a stud 54, 55

which has threaded engagement with member 52, and supports a tone modifying disc 56 in spaced relation with the armature and diaphragm, a lock washer 57 and nut 58 operating to secure the parts in the adjusted relation. The diaphragm 23 by means of the clamping discs 51 and 52 is somewhat stiffened, or its flexibility is somewhat modified relative to the property that would obtain were the disc 56 fixed to the diaphragm without these members, or with smaller members.

In a side wall of the cup 42 at a point in close juxtaposition to the deformations 32, 33 and 34, a slot or notch 60 is formed which provides clearance for an extension of the armature or rivet 61, secured in the members 51 and 52 and that provides means for engaging relation with the contact breaker assembly now to be described.

The contact breaker assembly is, as of the illustration, in Figs. 1, 2 and 3, and includes a strip 65 of spring steel attached at its ends to the horn back 20, at the deformations 34 by rivets 66, and is bridged over the deformation 33 as will be seen by reference to Figs. 1 and 3. To the intermediate portion of the strip is secured an adjusting plate 67, a movable contact plate 68 supporting a contact 69 and a fixed contact plate or bracket 70 supporting a contact 71. These elements are retained in assembly with the strip 65 by rivets 72 which pass through the adjusting plate 67, the strip 65 and bushings 73, the bushings tending to insulatingly support the contact carrying members from the frame structure and from each other, by receiving thereover an insulating strip 74 disposed against the strip 65, thence a connector plate 75, which provides a terminal lug 76 and which plate is disposed in engagement with the resilient plate 68 supporting the movable contact 69. A non-conducting plate 77 is then disposed against the contact supporting plate 68 and is apertured to receive the contact 69, and insulate the plate 68 from the more rigid bracket 70 supporting the fixed contacts 71.

After these members are placed upon the bushings 73, an insulating plate 78 is added against which the rivets 72 are peened over as at 79. This structure supports the contact actuator assembly upon the horn back 20 in adjustable relation thereto, through the torsional resiliency of the strip 65, and the contact supporting plate 68 and insulating plate 76 are positioned within the slot 60 of the coil cup 42, the extreme end of said plates disposed in engagement with the armature extension 61. The relative position of the contact breaker assembly with respect to the horn back 20 is determined by an adjusting screw 80 that is threadedly received in an extension or squirt 81 of the deformation 32, so that the said screw or stud comes into engagement with the end of the adjusting plate 67 heretofore described.

It is obvious that running the screw 80 in or out will operate to move the end of the plate 67 and thus stress or flex the strip 65, and since the adjusting plate 67 with the strip and contact supporting plates are secured together as a rigid assembly, movement of the plate 67 will tend also to move the bracket 70 and thus vary the engaging relation between the flexible plate 68 and insulator 76 with respect to the pin or actuator 61 of the armature device. Once the adjustment has been procured by means of the screw 80, the nut 82 will tend to maintain the adjustment or the flexing of the strip relative to the housing.

In the form of the illustration shown in Figs. 4, 5 and 6, the contact breaker assembly is mounted on a base plate or horn back 20a, by

means of a strip 65a of spring steel attached by rivets 66a at its ends to the base plate 20a. The spring strip 65a is bridged over an aperture 20b in the base plate for the insertion of the contact assembly. In this form the spring strip is of arcuate form and has attached to an intermediate portion, the same elements of contact support as explained above.

In place of mounting an adjusting screw 80 upon the horn back 20 as in the previous form, the adjusting screw is mounted in a rigid Z-shaped member or bracket 91, that is in turn supported by a motor frame 42a mounted on the base plate 20a and secured by rivets 96.

A core 39a of an electromagnet 35a has a reduced portion 41a which passes through the motor frame 42a and the Z-shaped member 91 where it is peened over at 46a against the Z-shaped member. A diaphragm 23a is affixed at its periphery between the flanges of the base plate 20a and a collar 94. At the central portion, the diaphragm 23a supports an armature 40a that has an integral stud 54a passing through the washers 52a, 52b, the diaphragm 23a, plain washer 50a, and a tone modifying disc 56a, thence a plain washer 57a, lock washer 57b and nut 58a. The nut 58a is threaded on the stud 54a by which it securely clamps the assembly together in adjusted relation.

The armature 40a with a small portion 40b passing through an aperture 95 in the base plate 20a, has an integral overhanging flange for engaging relation with the contact breaker assembly now to be described.

The contact breaker assembly as illustrated in Figs. 4, 5 and 6, comprises the strip 65a, carrying the adjusting plate 67, the movable contact plate 68 supporting the contact 69, and the fixed contact plate or bracket 70 supporting the contact 71. These elements are retained in assembly with the strip 65a by rivets 72a that pass through the adjusting plate and other elements as explained above, the bushings tending to insulatingly support the contact carrying members from the frame structure and from each other. This structure supports the contact breaker assembly upon the base plate 20a in adjustable relation thereto, through the torsional resiliency of the strip 65, and the contact supporting plate 68 and insulating plate 77 are thereby positioned within the aperture 20b in the base plate 20a, so that the extreme end of the plates are disposed in engageable relation with the armature extension 40c. The relative position of the contact breaker assembly with respect to the base plate 20a is determined by the adjusting screw 80a that is threadedly received in the Z-shaped member 91, so that the screw or stud 80a comes into engagement with the end of the adjusting plate 67 heretofore described.

In both instances, the spring 65 or 65a and the assemblies carried thereby are so mounted on the support therefor, that the member 67 will always be spring-urged against the end of the screw 80 or 80a. Running the screw 80 or 80a in or out operates to move the end of the plate 67, and thus twist or flex the strip 65 or 65a. Since the adjusting plate 67 with the strip and contact supporting plates are secured together as a rigid assembly, movement of the plate 67 will also move the structure rigidly secured to it, and thus vary the engageable relation between the flexible plate 68 and the members 61 or 40c of the armature. Once the adjustment has been procured by means

of the screws 80 or 80a, the nuts 82 or 82a will tend to maintain the adjustment as made.

In the form illustrated in Figs. 4, 5 and 6, the flexible contact support 68 is in engagement with the connector plate 75 that is provided with the terminal lug 76, as earlier described, to which may be secured a lead 87a electrically connected to a post 88a on the Z-shaped member 91. However, if so desired the connector plate 75 may be eliminated and the contact supporting plate 68 be provided with the terminal lug 76. A second lead 89 is connected to a post 90 that is insulatively supported on the Z-shaped member 91 and thence is electrically connected to the winding of the electromagnet 35a. The fixed contact bracket 70 provides an attaching lug 92 which has connection by a lead 93 with the other side of said winding, thus completing the electrical circuit through the magnet motor and terminal means outside of the casing, by which an energizing circuit may be connected.

In the operation, electrical energization of the magnet motor will create a flux across the air gaps between the core and the armature, which manifests in a bodily movement of the armature and tone modifying means carried by the diaphragm. This movement, upon engagement of the armature extension with the contact breaker assembly, will open the electrical circuit through the contact points 69 and 71, whereby the coil will be de-energized allowing the armature and attached elements to retract. This retraction of the armature device will operate to again close the circuit through the contacts 69 and 71, whereby the above cycle of movement will be repeated so long as the main circuit controller which causes the main circuit to function, remains closed.

In case the magnet motor does not operate efficiently, by reason of improper circuit breaker adjustment, the adjustment may be corrected by loosening the nut 82 or 82a, whereupon the screw 80 or 80a may be manipulated to accomplish the best setting of the contact points. Retightening of the nut 82 or 82a will maintain the desired adjustment.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In an electromagnetic horn having a housing, a diaphragm secured to the housing, an armature carried by the diaphragm and an electromagnet attached to the housing for actuating the armature, the combination with the armature, of a contact breaker assembly for controlling the electromagnet comprising, a resilient strip having its ends attached to the housing and providing an intermediate portion; a plate and a pair of contacts having one of their ends attached to the intermediate portion of the strip and the other ends thereof extending toward the axis of the housing; and adjusting means having screw threaded engagement with the housing and operable upon the free end of the plate for varying the flexed relation of the whole assembly relative to the housing and to maintain said flexed relation in each adjustment thereof.

2. In an electromagnetic horn having a housing, a diaphragm secured to the housing, an armature carried by the diaphragm and an electromagnet attached to the housing for actuating the armature, the combination with the armature, of a contact breaker assembly for controlling the electromagnet comprising, a resilient strip having its ends attached to the housing and providing an intermediate portion; a plate and a pair of contact carriers having one of their ends secured to the intermediate portion of the strip and the other ends thereof extending at different distances from the axis of the housing; adjusting means having screw threaded engagement with the housing and operable upon the free end of the plate to vary the flexed relation of the whole contact assembly relative to the housing, and means for locking the adjusting means in a fixed position.

ROBERT M. CRITCHFIELD. 45