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SOUND SIGNAL

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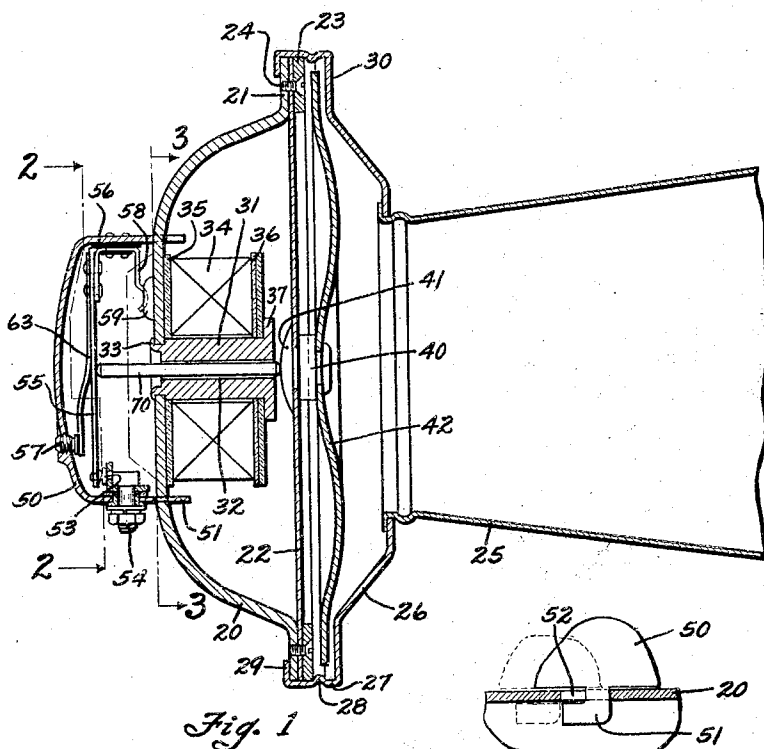


Fig. 1

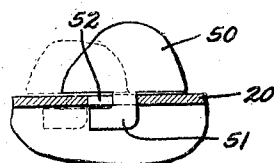


Fig. 4

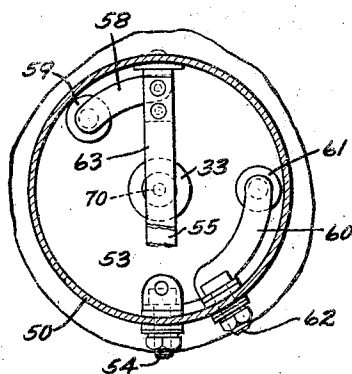


Fig. 2

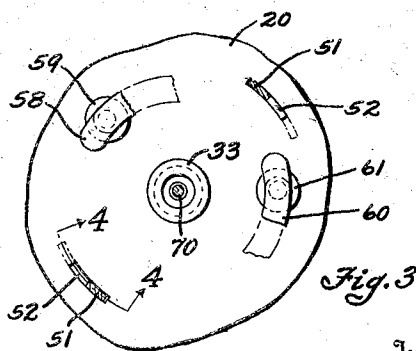


Fig. 3

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SOUND SIGNAL

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This invention relates to improvements in electromagnetically operated sound signals for motor vehicles and the like, and has for one of its objects to simplify the construction of this type of signal in order to provide for economical construction.

Another object of the present invention is to improve and simplify the construction of the magnetic circuit of the diaphragm motor.

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

In the drawing:

Fig. 1 is a cross sectional view of the signal device, a fragment of the tone projector being shown.

Fig. 2 is a fragmentary, part-sectional view taken along the lines 2—2 of Fig. 1.

Fig. 3 is a view similar to Fig. 2 taken along the lines 3—3 of Fig. 1.

Fig. 4 is a fragmentary detail view showing means for attaching the interrupter housing to the signal housing.

Referring to the drawing, numeral 20 designates a magnetizable housing, cup-shaped and having an outwardly extending annular flange 21 substantially at right angles to the axis of the housing. A diaphragm 22 fits upon the annular flange 21 and forms a flexible covering for the housing. A magnet ring 23 fits upon the outer peripheral portion of the diaphragm 22, a plurality of screws 24 extending through the ring 23 and the diaphragm 22 into the flange 21 and attaching said ring and diaphragm to said flange.

The tone projector 25 of the sound signal is secured to a base member 26 having an annular flange 27 adapted to fit about the edges of the ring 23, diaphragm 22 and the flange 21 of the housing. An annular rib 28, formed in the flange 27, engages the outside edge of the ring 23 and the edge of the flange 27 is spun over the flange 21 of the housing as shown at 29, thus the ring 23, diaphragm 22 and flange 21 of the housing are clamped

between the annular rib 28 and the spun-over flange 29 on the flange 27 of the projector supporting member 26. By this construction a space is provided between a flat portion 30 of the member 26 and the ring 23 as shown in Fig. 1.

An electromagnet is provided within the housing 20, said electromagnet comprising a core 31 having a longitudinal central passage 32. The one end of the core has a shoulder portion extending through an axial aperture in the housing, which is spun over the edge of said aperture as shown at 33, to rigidly support the core on the wall of the housing. A winding 34 is carried on the core 31 between insulating plates 35 and 36, the insulating plate 36 being interposed between the winding 34 and an enlarged head portion 37 provided at the free end of the magnet core 31. The outer surface of the head portion 37 is spaced from the diaphragm 22.

A magnetic stud 40 extends through an aperture in the diaphragm substantially coaxial with the core 31 of the magnet, the end of the stud extending beyond the side of the diaphragm adjacent the core being riveted over to secure the stud on said diaphragm and providing a head 41 having a spherical surface. The diaphragm 22 normally holds the spherically surfaced head 41 of the stud 40 in spaced relation with the head 37 of the core. Stud 40 supports a magnetizable resonator disc 42, the outer portion of said resonator disc extending into the space between portion 30 and the ring 23 and being normally held in spaced relation with said magnetizable ring 23 by the diaphragm, so that an air gap is provided in the magnetic field including the housing 20, the ring 23, resonator disc 42, stud 40 and the electromagnet core 31.

The interrupter for controlling the operation of the electromagnet is contained within a housing 50, the edges of said housing being provided with tongues 51 which are adapted to be inserted into openings 52 provided in the housing 20. The tongues 51 on the housing 50 are so shaped that a slight rotation of said housing 50 in one direction locks said housing 50 upon the housing 20.

A stationary contact 53 is insulatingly supported on the housing 50, said contact being provided with a terminal 54 outside the housing 50. A movable contact 55, in the form of a flexible arm, is insulatingly supported on the housing 50 as at 56, said contact normally being held in engagement with the stationary contact 53 by means of a blade spring 63 which is riveted to said contact member 55 adjacent its point of anchorage to the housing. A screw 57 provides an adjusting member to engage the spring 63 for varying its tension to adjust the pressure of engagement between the contacts 55 and 53. An extending portion 58 of the contact 55 is adapted to engage an insulating terminal 59 of the electromagnet when the housing 50 is attached to housing 20, while another resilient arm 60, insulatingly supported on the housing 50, engages the second terminal 61 of the electromagnet, said resilient contact 60 having a terminal 62 extending outside the housing 50. From this it may be seen that terminals 54 and 62 are adapted to receive wires for conducting electric current across contacts 53 and 55 to the electromagnet.

A connecting rod 70, preferably of non-magnetizable material, extends through the longitudinal passage 32 in the core 31, one end of said rod engaging the movable contact member 55 while its other end is engaged by the spherical head 41 of the stud 40.

When the circuit is closed, current flows through the terminal 54, across contacts 53 and 55 through portion 58 to terminal 59 and thence through the electromagnetic winding 34 through terminal 61 and spring connector 60 to the terminal 62, and the electromagnet will become energized and magnetic flux will find a circuit through the core 31, housing 20 and the diaphragm and electromagnetic ring 23 across the gap to the magnetic resonator disc and thence through the magnetic stud 40 across the gap to the core 31. This will attract the magnetic stud 40 toward the core 31, causing a flexing of the diaphragm. The movement of stud 40 toward the core will cause the connecting rod 70 to move the contact arm 55, against the effect of its spring blade 63, out of engagement with the stationary contact 53, thus breaking the circuit through the electromagnet and hence destroying its magnetic effect, the diaphragm 22, with the aid of the spring 63 acting through rod 70, returning toward its normal position as shown in Fig. 1, thereby again permitting closing the circuit by contact engagement at 53 and 55 respectively. The vibration of the diaphragm 22 will cause the resonator disc 42 to vibrate therewith and thus produce a tone which is projected through the projector 25.

The spherical surface of the head 41 of the magnetic stud 40 tends to concentrate the

magnetic lines of force at the center of the core or more specifically adjacent the axis of the core 31 and thus the diaphragm is caused to vibrate with a straight line motion, cocking thereof being substantially eliminated.

The present structure provides a simple magnetic circuit including essential portions of the horn or signal device, extra or additional portions which usually form the magnetic circuit of a similar device being eliminated and thereby the construction of this type of signal provides for economical production while still maintaining efficiency and good tonal values.

While the form of 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. An electric sound signal comprising in combination, an electro-magnet having a magnetic circuit; a housing in which the electro-magnet is supported, said housing forming a part of the magnetic circuit; a diaphragm attached to the housing and adapted to be operated by the electro-magnet; and a magnetizable resonator disc carried by the diaphragm so that the edge of said disc lies in juxtaposition to a portion of the housing.

2. An electric sound signal comprising in combination, an electro-magnet having a magnetic circuit; a housing in which the electro-magnet is supported, said housing forming a part of the magnetic circuit; a diaphragm attached to the housing and adapted to be operated by the electro-magnet; and a magnetizable resonator disc carried by the diaphragm, a portion thereof normally lying in close proximity to the housing, and another portion in juxtaposition to the electro-magnet.

3. An electric sound signal comprising in combination, an electro-magnet having a magnetic circuit; a housing in which the electro-magnet is supported, said housing forming a part of the magnetic circuit; a diaphragm attached to the housing and adapted to be operated by the electro-magnet; a magnetizable resonator disc; and means for securing the resonator disc to the diaphragm so that it is substantially parallel to and spaced from the diaphragm and its outer peripheral surface lies adjacent the housing and its central portion adjacent the electro-magnet.

4. An electric sound signal comprising in combination, an electro-magnet having a magnetic circuit; a cup-shaped housing of magnetic material for the electro-magnet, said housing having an annular flange; a diaphragm attached to the flange of said housing; a magnetizable resonator disc; and

a magnetizable stud secured centrally to the diaphragm, said stud centrally supporting the resonator disc substantially parallel to and in spaced relation with the diaphragm, the peripheral edge of said disc extending over and spaced from the annular flange of the housing.

5. An electric sound signal comprising in combination, an electro-magnet; a magnetic core for said magnet; a housing of magnetic material to which one end of the core is secured, said housing having an annular flange; a diaphragm attached to the housing and spaced from the free end of the core; a magnetic stud carried by the diaphragm, one portion of said stud extending from one side of the diaphragm and normally held in properly spaced relation with the free end of the core by the diaphragm, and a magnetizable resonator disc carried by the stud so that said disc is substantially parallel to and spaced from the diaphragm, the peripheral edge of said disc extending over and spaced from the annular flange of the housing.

6. An electric sound signal comprising in combination, an electro-magnet; a magnetic core for said magnet; a housing of magnetic material to which one end of the core is secured, said housing having an annular flange; a diaphragm attached to the housing and spaced from the free end of the core; a magnetic stud carried by the diaphragm so as to be coaxial of the core, said stud having a spherically shaped head extending from one side of the diaphragm and normally held in properly spaced relation with the free end of the core by the diaphragm, and a magnetizable resonator disc carried by the stud so that said disc is substantially parallel to and spaced from the diaphragm, the peripheral edge of said disc extending over and spaced from the annular flange of the housing.

7. An electric sound signal comprising in combination, an electro-magnet having a magnetic circuit; a cylindrical, cup-shaped housing for said electro-magnet, forming a part of the magnetic circuit thereof, said housing having an annular flange about its periphery, substantially at right angles to the axis of the housing; a diaphragm fitting upon said flange; a magnetic ring; means for securing the diaphragm and ring to the flange; a magnetic stud secured to the diaphragm; and a resonator disc forming a part of the magnetic circuit, said disc being carried by the stud so that the diaphragm and disc are spaced, in substantially parallel relation and the peripheral portion of the resonator disc is normally adjacent to and spaced from the magnetic ring to provide the air gap.

8. An electric sound signal comprising in combination, a magnetic housing having a peripheral flange; a diaphragm; a magnetic resonator disc carried by the diaphragm so that its peripheral surface lies in juxtaposi-

tion to the flange of the housing, a projector, and an electro-magnet adapted magnetically to operate the diaphragm and resonator disc, the magnetic circuit of said electro-magnet including the housing, the diaphragm and resonator disc.

9. An electric sound signal comprising in combination, a housing of magnetic material, having a flange; a sound producing diaphragm, a sound projector; a resonator disc of magnetizable material, supported by the diaphragm in a chamber formed in the housing between the projector and said diaphragm the outer surface of said resonator lying in juxtaposition to the flange of the housing; and an electric motor adapted magnetically to operate the diaphragm and resonator disc, said motor comprising a coil carried upon a magnetic core, one end of which is attached to the housing, the other end being spaced from and substantially parallel to the central portion of the magnetic resonator.

In testimony whereof I hereto affix my signature.

WALTER W. RIEDEL.