ELECTROMAGNETIC HORN MOTOR


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1 Claim. (Cl. 318—134)

This invention is concerned with an automotive horn and more specifically with a warning device in which the audible signal is produced by the vibrations of a metallic diaphragm which in turn is energized by the oscillation of a buzzer or door bell type motor.

This invention is more particularly concerned with an improvement in the electrical circuit of such a device. This particular improvement is best understood by a study of the drawings in which:

Figure 1 is a section through a horn motor and;

Figure 2 is a section through a portion of the control apparatus for a horn motor, and

Figure 3 is a circuit diagram of the electrical portion of the horn motor.

Referring to Figure 1, diaphragm 10 is oscillated by slug 11 which in turn is attracted to post 12 when coil 13 is energized. The movement of slug 11 towards post 12 under the influence of coil 13 causes slug 11 to impart a vertical motion to pin 14 which in turn opens contact points 15 which interrupt the current through coil 13 and permits slug 11 to return to the at rest position.

In the usual horn construction, contact points 15 are shunted by a resistor to lengthen the life of the contacts and suppress arcing. This resistor is objectionable because it permits a continuous partial energization of coil 13 even when contact points 15 are open. Inasmuch as a horn works essentially upon differences in the flux intensity in the magnetic circuit, the presence of this resistor requires a needlessly heavy magnetic and electrical circuit to permit the flux density to be raised above the norm established by the presence of the shunting resistor.

The structure disclosed by this invention eliminates the usual resistor and substitutes therefore a selenium rectifier as is more clearly shown in Figure 3. In Figure 3, the contact points are again designated as 15, the coil is 13, and the selenium rectifier is designated as 16. Note that rectifier 16 shunts coil 13 and not contact points 15. It will be noted that when the horn is energized, the current flows from positive point 17 through coil 13 through contact points 15 to negative point 18. Current flowing in this direction, that is the working current, is unable to flow through that portion of the circuit including selenium rectifier 16. To properly practice this invention, it is essential that the active portion of the selenium rectifier be clamped against a cadmium plated steel surface with sufficient pressure to partially nullify its inherent rectifier characteristics. For example, in a typical coil 12 volt horn application of a forward voltage of about 5 volts on the selenium rectifier considered apart from the coil should cause a current of about 2½ amperes to flow. Similarly a reverse voltage of 15 volts should cause not more than 0.25 ampere to flow. Ordinarily, this would be considered a very poor rectifier. However, the instant contact points 15 open, the inductance in coil 13 tends to continue the existing flow of current. This current now flows through selenium rectifier 16 in a forward direction and is dissipated by the ohmic resistance of this rectifier. The dissipation of this energy in selenium rectifier 16 preserves the contact points themselves from destruction by such energy.

In Figure 2, there has been shown a preferred example of a horn mechanism incorporating this invention. Here the upper contact point of contact points 15 is supported upon spring member 19. Beneath spring member 19 is insulator 20 through which the upper of contact points 15 projects. Beneath insulator 20 is a rigid member 21 which supports the lower of contact points 15. Rigid member 21 is insulated by insulator 22. Upper plate 23 and rivets 24 serve to secure the entire assembly to the body 25 which is, of course, at ground potential. Rectifier plate 26 is secured beneath upper plate 23 and clamped solidly in position by the pressure exerted by rivet 24. It is essential that the lower face of upper plate 23 which is in contact with the rectifying surface of rectifier 26 be cadmium plated and that rivet 24 exert sufficient pressure to nullify a portion of the rectifying action of this plate. This structure, illustrated in Figure 2, has been given as a typical and convenient arrangement.

However, it is to be understood that any electrical equivalent in which a selenium rectifier shunts coil 13 and in which the rectifying action of selenium rectifier 16 is partially nullified by strong pressure against a cadmium plated surface may be used.

This apparently simple structure has resulted in a saving of 40% in the current required to operate a horn and has extended the life of the horn at least 10 fold.

I have specifically disclosed a selenium rectifier as the proper shunting mechanism for the horn contact points. However, other rectifier means may be used provided they present a substantial resistance to the flow of current in the forward direction. This resistance must be large compared to normal rectifiers to provide ohmic resistance to dissipate the inductive energy of the coil.

It will be understood that the invention is not to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of the invention, as defined in the appended claim.

I claim as my invention:

A buzzer type motor including an armature, a solenoid to propel said armature and contact points to interrupt the flow of electrical current through said solenoid, said solenoid being shunted by a selenium rectifier in which the active face of the rectifier is clamped against a cadmium plated metal plate under sufficient pressure to partially nullify the inherent rectifying properties of such rectifier, said rectifier being polarized to permit current to flow as the magnetic field of the solenoid collapses.

References Cited in the file of this patent

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