

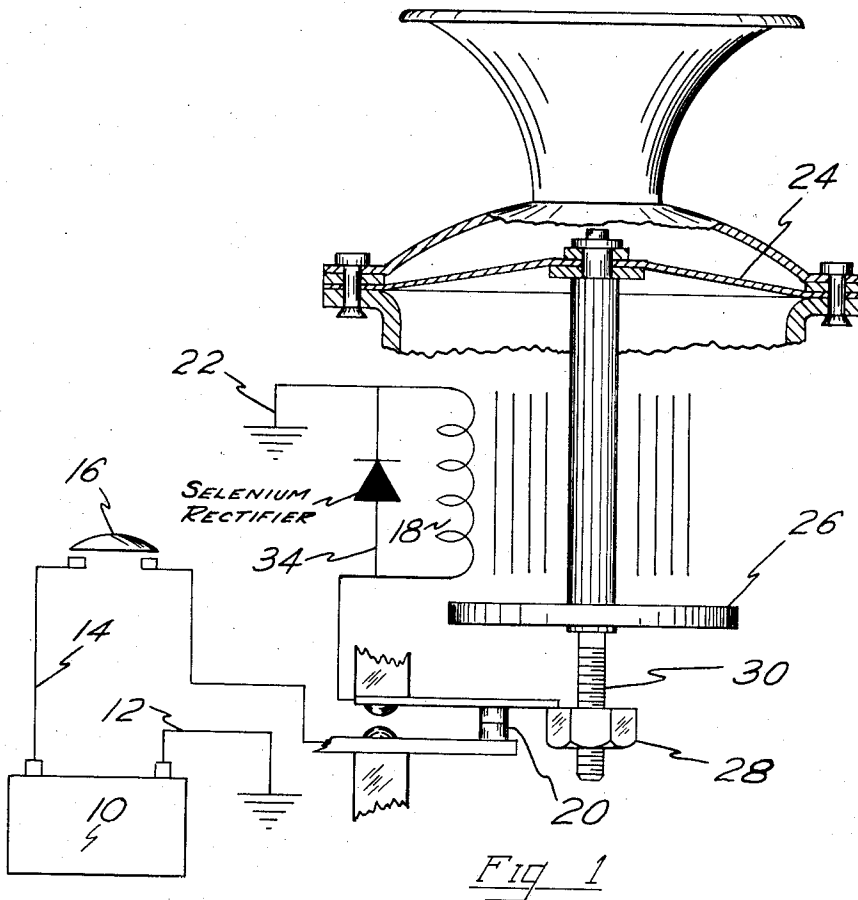
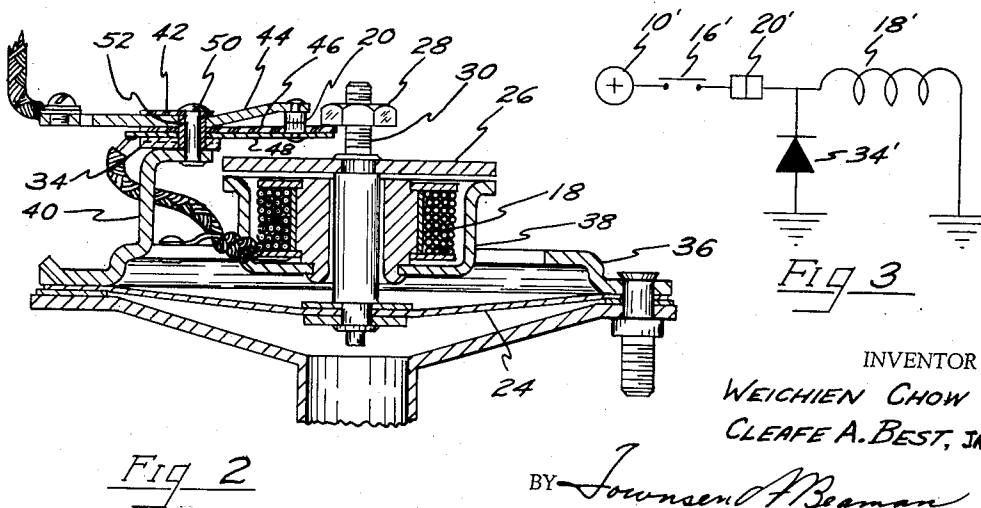
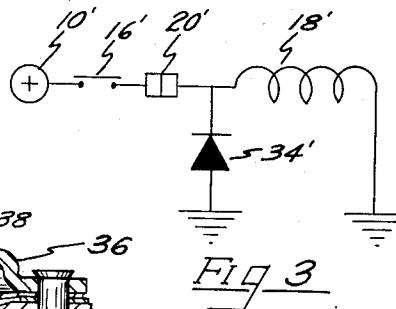
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HORN CIRCUIT

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HORN CIRCUIT

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2 Claims. (Cl. 340—403)

The present invention relates to improvements in magnetic type horns for automobile vehicles constructed with a field, an armature, a field coil, a pair of contact breaker points, means for breaking the points, and means for reducing the arc across the points upon the interruption of the flow of current in the field coil.

In horns of the aforesaid type, the flow of current in the field coil sets up a magnetic flux in the iron of the field. When the breaker points are open and the current ceases to flow through the field coil, the field collapses and a voltage is induced in the coil. Due to the rapidity of the collapse of the field, the induced voltage becomes so high that an arc is created across the breaker points, of such intensity that the point life is very short unless some means is provided to reduce the potential across the points upon collapse of the field.

Heretofore it has been the practice in the manufacture of automotive horns of the aforesaid type, to reduce the rapid collapse of the field by a resistor which is shunted across the breaker points. When the points open, the resistor is in series with the current source and the field coil. Therefore, a certain amount of current is passed through the field coil even though the points are separated and this small amount of current retards the collapse of the field and reduces the voltage across the points whereby satisfactory point life is obtained. This resistor protecting the points must be of a value that will not pass enough current through the field coil when the points are separated as to retard the movement of the horn diaphragm and thus unduly reduce the sound output of the horn but will pass just enough current to keep the voltage down across the breaker points.

The manufacture of horns for automotive vehicles is highly competitive. To meet competition it becomes necessary to reduce the component parts of the horn to a minimum and design the horn to enable automation of assembly to the greatest possible extent. This has been accomplished by the present invention by making a substantial departure from accepted practices with the elimination of the point protecting resistor and the assembly problem connected with it.

According to the present invention, in lieu of the conventional resistor in shunt relation to the breaker points, a rectifier is employed in shunt relation to the field coil. Preferably, the rectifier is a selenium rectifier, which in its preferred form comprises a selenium coating upon a flat strip capable of being readily assembled as part of the contact stack. This results in the elimination of the resistor and its bracket, neither of which lends itself to being a convenient part of the contact stack assembly. Also, it becomes possible to reduce the number of insulators and spacers heretofore present in the contact stack.

As an object of the invention, it is proposed to provide a less costly horn of the type described without sacrifice of performance and length of service through the use of a rectifier.

Another object of the invention is to provide a less

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costly horn of the type described without sacrifice of performance and length of service through the use of rectifier in shunt relation to the field coil.

A further object of the invention is to provide a horn of the type described in which a strip form selenium rectifier is employed as part of the contact stack to protect the breaker points.

A still further object is to provide an improved horn of the type described in which the breaker points are protected from arcing upon collapse of the field coil by dissipation of the induced voltage taking place within the field coil.

These and other objects and advantages residing in the present invention will more clearly appear from the following specification and the appended claims.

In the drawings,

Fig. 1 is a diagrammatic showing of a horn circuit employing a rectifier to protect the breaker points,

Fig. 2 is a cross sectional view through a contact stack of a horn showing a preferred form of rectifier employed as part of the stack assembly, and

Fig. 3 is a modified circuit diagram.

Referring to the drawings, in Fig. 1 the current source takes the form of a battery 10 having a ground connection 12 and a lead 14 to the usual horn switch 16. The field coil 18, breaker points 20, ground connection 22, horn diaphragm 24 and armature 26 with an actuator 28 and a shaft 30 and engaging with the arm 32 carrying one of the points 20, all may be of conventional design and arrangement. In lieu of the usual resistor in shunt relation with the points 20, a suitable rectifier 34 has been provided in shunt relation to the field coil 18 to quench the arc that would otherwise occur across the points 20. In its shunted relation with the coil 18, the character and construction of the rectifier 34 is such that only the induced forces upon collapse of the field, following separation of the points 20, are impressed upon the rectifier in a direction to short circuit the coil and dissipate such forces within the coil itself and its associated structure.

In Fig. 2 is shown one form of contact stack of a horn of the type shown in Fig. 1. The diaphragm 24 has peripheral mounting upon the member 36 from which the cup portion 38 is formed and supported and in which the field coil 18 is located. Shaft 30 of the armature 26 is connected to the armature 26 and the diaphragm 24 in any suitable manner. Actuator 28 for the contacts 20 may be in the form of a single elastic stop nut threaded upon the shaft 30. The contact stack carried on the bracket portion 40 comprises an insulator 42, a contact support 44, a spring insulator 46, a contact spring 48 and a selenium rectifier 34. The rivet 50 is insulated by a sleeve 52 and insulator 42 from the contact support 44 and the contact spring 48.

It will be noted that the rectifier 34 is in the form of a flat strip having its lower surface in direct contact with the bracket 40 and its upper surface in direct contact with the under side of the contact spring 48. This arrangement places the rectifier 34 in the electrical circuit by merely inserting the same in the stack. It also has the advantage of disposing the rectifier 34 in a protected position between the bracket 40 and the contact spring 48.

The selenium rectifier 34 may be of well known construction as, for example, a strip of aluminum having one surface coated with a very fine spray of the metallic alloy to provide the front electrode. In practice, the overall thickness of the rectifier will be in the order of .036" when the rectifier is being used as a point protective means in a standard horn used in automotive vehicles having an output not to exceed twelve volts.

In the determination of the net area of the rectifier 34 for use in horns of the type and construction now used

generally in passenger automobiles, the following factors should be taken into consideration: (a) cost of material, (b) ability to quench released energies stored in the coil, (c) ability to maintain proper phase relationship in the horn circuit, and (d) the desired life expectancy of the contacts.

The net area of the single cell selenium rectifier 34 is measured by subtracting from the gross area, the necessary mounting holes. The net area of the rectifier 34 should be large enough to allow for quick release of the energy stored up by the coil 18 when the contacts are open and at the same time the rectifier 34 should have a net area which is small enough for economical consideration and of a size which will fit within the space available for installation. Increasing of the size of the rectifier 34 will raise the average current of the horn which may subsequently cause the coil 18 to be burned out unless higher insulating properties of the magnetic wire are provided or better cooling arrangements made for the coil 18. An over size rectifier 34, a very high reverse current characteristic rectifier, a high voltage rectifier, or a high heat resistance rectifier have all been found to be undesirable with horns of the type now in use in passenger automobiles. For example, an expensive germanium rectifier is capable of suppressing the arcing of the horn contacts quite satisfactorily, but at the same time its characteristics are such that it functions to reduce the sound output level of the horn to an unacceptable value. The forward resistance of the rectifier 34 should be as low as commercially available, but the backward resistance should be in the order of one hundred times or more of the forward resistance. A value of two amperes leakage at minus ten volts for a six inch by six inch sheet of rectifier stock from which the rectifier 34 is fabricated has been found to be acceptable.

It is to be understood that the rectifier 34 is over loaded in the horn application. A large leakage characteristic will help prolong the life of the rectifier 34. A rectifier having a net area of three quarter square inches has been found adequate for the arc suspension purposes for standard type horns used upon passenger vehicles and not exceeding twelve volts input. It has been noted that the

arcing time is reduced when a rectifier is used as a suppressor as compared to the use of a resistance across the contacts. In order that the sound level of the horn not be materially reduced, the rectifier 34 should be so designed that some arcing actually remains in the circuit and yet the contacts are adequately protected. By locating the rectifier 34 adjacent the rear housing, the large surface area provides the necessary heat dissipation. Other specifications of an acceptable rectifier 34 includes a mechanical test and a short circuit test. For the mechanical test, the rectifier may be bent 90° around a one-half inch diameter mandril, in which case the alloy may show cracks, but does not peel off. For the short circuit test, the rectifier should not contain a blow hole larger than one-eighth inch in diameter when a reverse voltage of eighteen volts D. C. is applied.

We claim:

1. In a magnetic type horn, a contact stack assembly comprising a conductive supporting member having a stack supporting surface, a rectifier strip directly imposed upon said surface, a conductive contact carrying member directly imposed upon said strip in contact relation with the front electrode surface of said rectifier, an insulator directly imposed upon said contact member, a second conductive contact carrying member directly imposed upon said insulator, a second insulator directly imposed upon said second contact member, and means insulated from said contact carrying members for clamping the components of the stack.

2. In a magnetic type horn as defined in claim 1 wherein said stack support surface is in conductive relation with one surface of said rectifier and said stack support surface is located in a conductive circuit along with said rectifier and shunting said coil.

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