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STRAIN RELIEF FOR LINE CORDS

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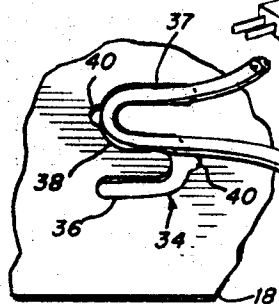
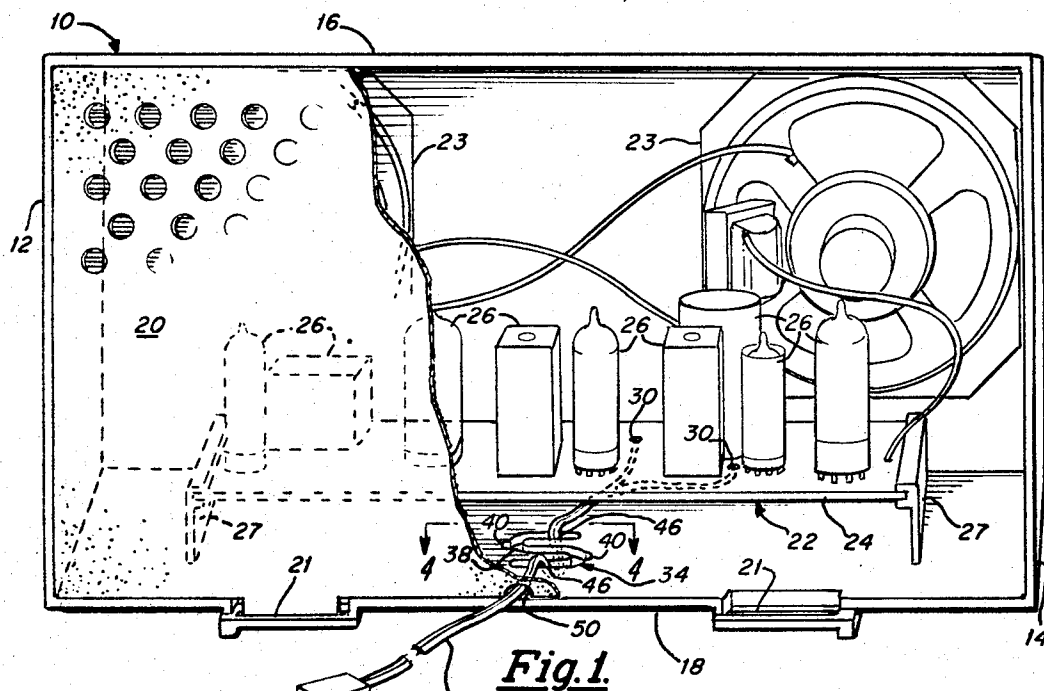


Fig. 2.

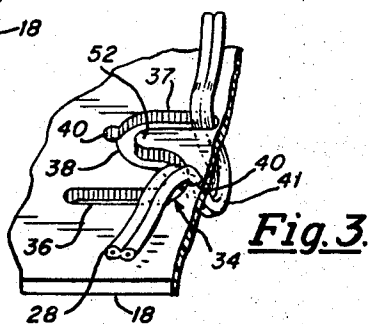


Fig. 3.

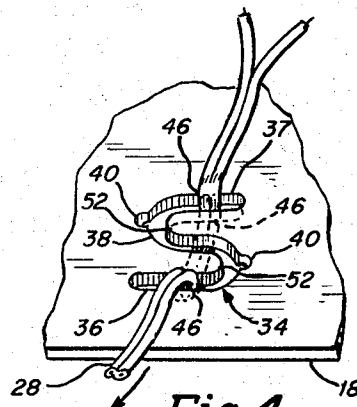


Fig. 4.

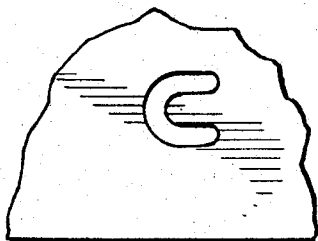


Fig. 5.

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STRAIN RELIEF FOR LINE CORDS

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ABSTRACT OF THE DISCLOSURE

A line cord strain relief for a radio cabinet comprising an S-shaped opening in the bottom wall thereof. The pliant line cord is conformed to a portion of the opening and looped about the two tabs formed by said opening to provide a firm connection for said cord which may not be dislodged by transverse movements.

Disclosure

This invention relates in general to A.C. line operated electrical apparatus and in particular to economical and effective means for relieving strain at the electrical connection of a line cord and the electrical apparatus. More particularly, this invention relates to A.C. line operated radio receivers having cabinets fabricated of insulating material and means for preventing strain from being transmitted through the line cord to the electrical connection with the receiver chassis.

In small radio receivers having molded plastic cabinet housings, the line cords used therewith for conducting power from an A.C. source to the chassis are fabricated of a pliant rubber or rubber like material, and are typically secured to the cabinet by an encircling clamp, clip or the like cooperating with a threaded fastener which engages a boss provided in the cabinet interior. The clamp or clip securing the line cord to the cabinet prevents a sudden pull or jerk from imposing a potentially damaging strain on the electrical connection to the chassis and possibly creating a danger to the user.

Another method of preventing damage to the electrical connection between the line cord and the chassis, is to provide a female socket connector at one end of the line cord. This socket connector is removably attached to the cabinet rear cover by a retaining clip and cooperates with a male plug protruding from the chassis. The connector and plug thus form a well-known type of electrical safety interlock. While this interlock connection has many desirable aspects, it is quite expensive since the female connector requires a separate molding step, and the rear cover must be securely fastened to the cabinet. In many applications, an electrical interlock is unnecessary and its additional expense is thus unwarranted. In these situations, the line cord may be electrically connected directly to the chassis, such as by soldering, and simplified, inexpensive means may be provided for protecting the connection against damage.

This invention provides such inexpensive means for eliminating strain which might be imposed upon the direct electrical connection of a line cord to a chassis. The invention accomplishes this without the necessity of fasteners, clamps, clips, or the like, by providing an opening in the bottom of the cabinet for receiving a segment of the line cord. The line cord assumes a generally undulated shape after being received by, and positioned in the opening, and the pliant properties thereof result in contact with the cabinet bottom which insures an ex-

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remely large coefficient of friction. The large coefficient of friction prevents the line cord from being pulled through the opening, eliminating strain from being transmitted to the electrical connection.

The configuration of the opening allows the line cord to be inserted therein without the necessity of threading it such as one might thread a length of thread through the eye of a sewing needle. Consequently, the line cord may be secured to the cabinet bottom even though one of its ends is permanently connected to the chassis, and the remaining end has a molded plug which is larger than the opening. The configuration of the opening prevents unintentional or accidental disengagement of the line cord, although it may be easily engaged therewith by a relatively unskilled worker with a minimum of time and effort.

Accordingly, it is the primary object of this invention to provide economical means for relieving possible strain at the electrical connection of a line cord and a chassis.

Another object of this invention is to provide means for relieving possible strain at the electrical connection of a line cord and a chassis without the necessity of additional parts such as clamps, clips, fasteners or the like.

A further object of this invention is to provide economical means for relieving possible strain at the electrical connection of a line cord and a chassis by providing an opening in a wall of the cabinet housing said chassis, and deflecting the cord through the opening in a manner which effects a large coefficient of friction therebetween.

A feature of this invention resides in the shape of the opening through the cabinet wall which allows a segment of a line cord which may have constrained ends, to be inserted and permanently maintained therein.

Other objects and features of this invention will become apparent upon an examination of the following description taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a three dimensional rear view of a line operated A.C. radio receiver and cabinet in which the invention is incorporated. The cabinet back cover is partially cut away to expose the opening in the bottom wall and the line cord passing therethrough.

FIG. 2 is an enlarged top plan view of the cabinet bottom wall showing the position of the line cord with respect to the opening during the first step of inserting the cord therein.

FIG. 3 is an enlarged three dimensional top view of the opening showing the position of the cord during the second step of inserting it in the opening.

FIG. 4 is an enlarged three dimensional top view taken along line 4-4 of FIG. 1, showing the position of the line cord when fully engaged with the cabinet bottom wall.

FIG. 5 is a top view of an alternate embodiment of an opening configuration which may be used to secure a line cord to a cabinet wall.

Referring now to FIG. 1 of the drawings, there is shown a line operated A.C. radio receiver having a cabinet generally referred to by reference numeral 10 preferably fabricated of plastic insulating material. Cabinet 10 comprises side walls 12 and 14, a top wall 16, and a bottom wall 18. A removable back cover 20, having closing tabs 21, is provided to close the rear of the cabinet during assembly thereof, and to facilitate access to the receiver components in the event servicing is required.

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The cabinet houses a chassis 22 for receiving and translating radio signals which are reproduced by a pair of loudspeakers 23. Chassis 22 generally comprises a printed circuit board 24 which supports the receiving and translating components 26, necessary for proper radio receiving operation. The printed circuit board is maintained substantially parallel to bottom wall 18 by a pair of integrally molded side supports 27. Side supports 27 also provide adequate clearance between the underside of the printed circuit board and the top of bottom wall 18, for connecting components 26 to the copper foil.

An insulated, current carrying line cord 28 is provided to supply power to the receiver from an A.C. source. The cord has a generally oblong cross-section, with one end connected to the underside of the chassis at 30, by any convenient method such as by soldering it directly to the etched copper foil. The remaining end of the line cord has a molded, two pronged male electrical plug 32.

An opening 34 is provided through one of the cabinet walls, such as the bottom wall 18. This opening, best seen in FIGS. 2, 3 and 4 is substantially S-shaped and comprises straight, parallel leg portions 36 and 37 at the outer extremities, interconnected by an aperture or passage 38. The width of the opening is slightly larger than the smallest cross-sectional dimension of the oblong line cord. Notches 40 are provided at the reverse bends of the S-shaped opening to assist in inserting the cord therein, without twisting.

Referring particularly to FIG. 2, the line cord is inserted into the opening by bending the desired segment to conform to the shape of one-half of the S, that is by bending it into the shape of a U with the largest cross-sectional dimension perpendicular to the wall. The bent cord segment is aligned with one of the reverse bends as in FIG. 2, then rotated 90° resulting in the configuration of FIG. 3, wherein a loop 41 extends through one surface of the wall, and the two ends of the cord extend through one leg and aperture 38, to the other surface. The end of the cord extending through aperture 38 is then moved into one of the notches 40 where it is twisted one-fourth of a turn, then readily manipulated into the remaining leg.

The final path of the line cord through the opening is shown in FIG. 4 wherein it is seen that the cord originates from the top surface of the wall, passes to the bottom surface through a leg 37, and returns to the top surface through the other leg 36. A small length of the line cord remains on the surface opposite the wall from the two ends. The line cord emerges from the receiver cabinet through a hole 50 provided at the bottom edge of the back cover adjacent opening 34.

The line cord is maintained in the opening and prevented from being pulled through legs 36 and 37 thereof by opposing resistive forces which are a function of the line cord and bottom wall materials, and the contacting forces therebetween. The force in turn is a function of the pliant properties of the line cord, that is, the tendency of the line cord to return to its initial shape, and is also related to the force tending to dislodge it from the opening.

Contact between the line cord and the bottom wall takes place along lines of contact 46 at the edges of the legs where the line cord passes thereover. The edges of the legs are sharp and tend to dig into the relatively soft line cord insulating material. A force on the line cord in the direction of the arrow of FIG. 4 increases the contact of the line cord with the edges of the opening, and further resists movement of the cord.

Once the line cord is inserted into opening 34 and manipulated into the position shown in FIG. 4, it is prevented from accidentally disengaging therefrom by the two solid fingers 52. Thus, the line cord can move transversely without being able to be unintentionally disengaged from the opening. On the other hand, should it

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be desirable to remove the line cord from the opening, it can be easily accomplished by reversing the steps used to insert it therein.

An alternate embodiment of the opening is shown in FIG. 5, and may be more useful under certain conditions. This embodiment is generally U-shaped and the line cord is secured thereto as in the first step of the above embodiment. The line cord is restrained from being pulled therethrough in a similar manner, but it could become disengaged if moved transversely in the opening. This could be an advantage under those circumstances where the cord must be inserted and taken out often.

What has been described is means for securing a line cord in positive, but removable engagement with a wall of a cabinet thereby preventing strain on the electrical connection thereof with a chassis, without the requirement of additional parts such as clamps, clips, fasteners or the like.

It is obvious that upon study by those skilled in the art, the disclosed invention may be altered or modified both in physical appearance and construction without departing from its inventive concept. Therefore, the scope of protection to be given this invention should not be limited by the embodiment described above, but should be determined by the essential descriptions thereof which appear in the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows.

I claim:

1. In electrical apparatus having a housing of insulating material, strain relief means for removably securing a pliant current carrying insulated cord to said housing comprising; a planar part of said housing defining an S-shaped opening including a pair of oppositely disposed finger-like tabs in side-by-side relationship; said opening having a width sufficient to admit said cord; a section of said cord intermediate its ends being removably fixed to said planar part by conforming it in said opening to the perimeter of a first of said tabs, looping it through said opening down around the base of said first tab and manipulating the section of said cord intermediate said tabs around the second tab whereby said cord traverses a sinuous path having an entrance and exit on one side of said planar part and looping about both said tabs on the opposite side thereof.

2. In electrical apparatus as set forth in claim 1 wherein said pliant cord has an oblong cross section and wherein at least a portion of said S-shaped opening opposite the apex of said second tab is of larger dimension; the width of said opening being greater than one cross sectional dimension of said cord but less than the other, whereby said cord may be turned in said portion to facilitate manipulation around said second tab.

3. In a radio receiver having a chassis enclosed by an insulated cabinet including a bottom wall; an electrical line cord having a plug on one end for connection to a source of electrical power and being connected at the other end to said chassis; strain relief means for removably securing said cord to said cabinet comprising an S-shaped opening defined by said bottom wall, said S-shaped opening including a pair of oppositely disposed tabs in side-by-side relationship; said cord having a generally oblong cross section and said S-shaped opening having a width dimension greater than the smaller of the cord cross sectional dimensions, but less than the larger of the cord dimensions; a section of said cord adjacent to said chassis being removably affixed to said bottom wall by conforming it in said opening to the perimeter of a first of said tabs, looping it through said opening down around the base of said first tab and manipulating the section of said cord intermediate said tabs around the second tab; and an enlargement in the width of said S-shaped opening adjacent the apex of said second tab

to facilitate manipulation of said cord whereby said cord traverses a path having an entrance and exit within said cabinet and a looping portion around both said tabs outside said bottom wall of said cabinet.

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