March 7, 1967 D. M. BOYD 3,308,416

DEEP GROOVED CONTINUOUS ELECTRICAL OUTLET RECEPTACLE

Filed Oct. 22, 1965

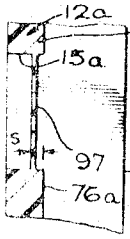


Fig. 7

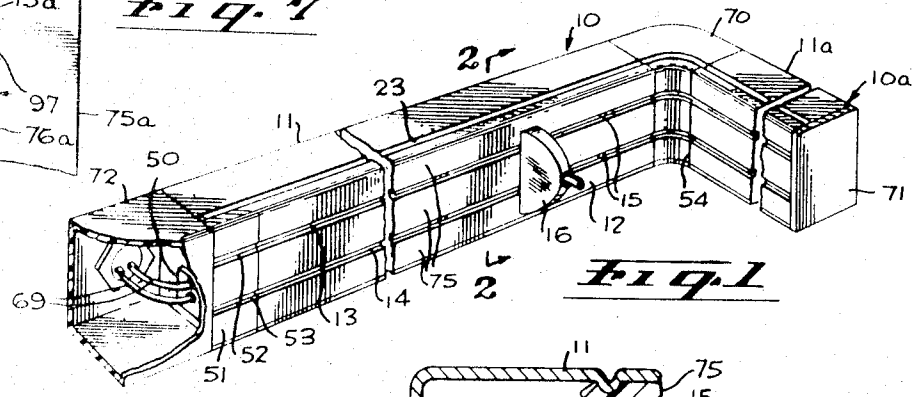


Fig. 1

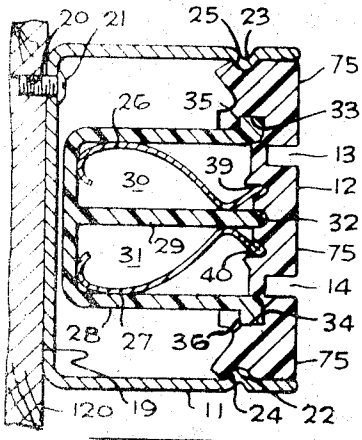


Fig. 2

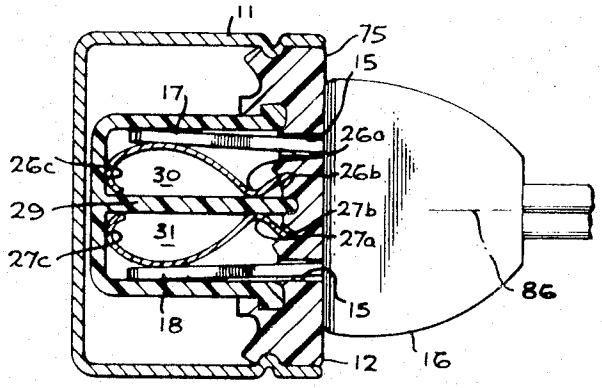


Fig. 3

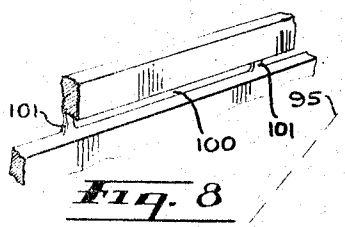
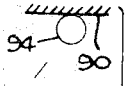


Fig. 8



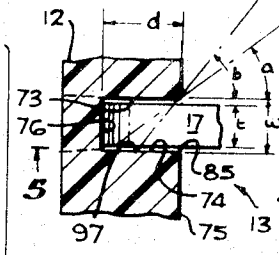


Fig. 4

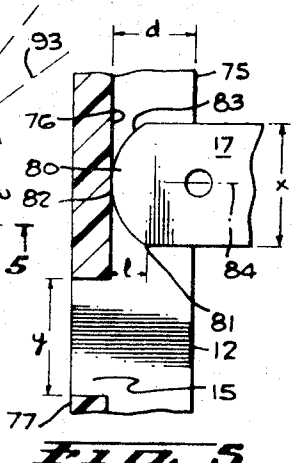


Fig. 5

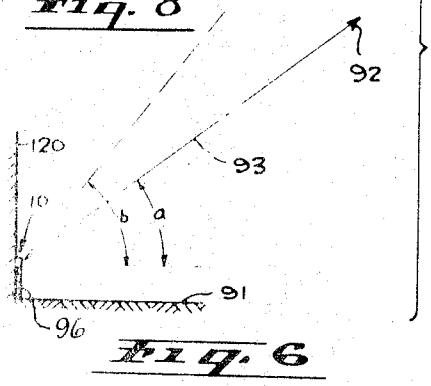


Fig. 6

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DEEP GROOVED CONTINUOUS ELECTRICAL OUTLET RECEPTACLE

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Filed Oct. 22, 1965, Ser. No. 500,606
7 Claims. (Cl. 339—22)

The present application is a continuation-in-part of my co-pending application, Serial Number 229,985, filed October 11, 1962 and now abandoned on "Deep Grooved Electrical Outlet Receptacle," which application in turn was a continuation in part of my application Serial Number 44,389, filed July 21, 1960 on "Grooved Electrical Outlet Strip," now abandoned, and my prior application, Serial Number 827,528, filed June 16, 1959 on "Electrical Outlet Strip With Shielded Blade Couplings," now abandoned.

This invention relates to an improved elongated electrical outlet strip, of a type adapted to extend along the wall or baseboard of a room, and into which conventional electrical plugs can be connected at any of different locations along the length of the strip. Certain features of the apparatus covered in the present application are also similar to an arrangement disclosed in my prior application, Serial Number 534,668, filed September 16, 1955 on "Continuous Electrical Receptacle Having a Plurality of Recessed Polarity Access Slots," now abandoned.

To allow for the connection of the prongs of a conventional male connector plug into an outlet strip embodying the invention, the strip is provided with an electrically insulative front wall structure having a number of pairs of apertures at different locations spaced along the length of the outlet strip, so that the prongs of a plug may be inserted through any convenient pair of the apertures for engagement with power supply contacts at the rear side of the wall. The continuous outlet strip may extend entirely about the periphery of the room, except as necessarily interrupted at door openings and the like, so that plugs may be connected into the strip at any desired point along the periphery of the room, to thereby give complete flexibility to the arrangement of electrically energized units in the room.

The novelty of the present invention has to do particularly with a unique construction for the above-discussed front wall structure or face plate structure of the outlet strip. Specifically, this novelty is directed toward the provision in the wall of a pair of generally horizontally extending parallel relatively deep grooves, extending between and interconnecting successive pairs of the above-discussed prong receiving apertures. As will appear, these grooves serve a plurality of different purposes, and for each of these purposes must be of very substantial depth inwardly from the rest of the front surface of the face plate structure. Desirably, the grooves extend continuously along the entire horizontal length of the face plate or front wall of the outlet, with the prong receiving apertures extending rearwardly or inwardly through the face plate from the backs of the grooves.

In the first place, the provision of two such relatively deep grooves in the surface of the face plate structure serves the very advantageous purpose of essentially removing the individual prong receiving apertures from sight. Since the apertures extend rearwardly from the backs of the deep grooves, the apertures are no longer visually perceptible when the grooves are viewed from most angles. Such elimination of visual perception of the apertures vastly increases the safety of the outlet strip by reducing the tendency for children to insert foreign objects into the apertures. Psychological studies have indicated that localized spots, such as easily visible prong receiving apertures, will inherently attract children, and tend to cause the children to insert foreign objects into the spot areas. The provision of deep grooves in the present device substitutes lines for the spots, with a consequent decrease in the tendency for children to insert objects into the prong receiving apertures.

Also, the substitution of lines for spots in the appearance of the face plate increases the acceptance of the outlet strip by interior decorators, since most decorators refuse to suggest outlet strips whose appearance is interrupted by successive spaced pairs of prong receiving apertures. These same decorators will accept a strip having a linear appearance not interrupted by localized spots.

Further in accordance with the invention, it is shown that superior uniformity of visual effect is achieved by variation of the depth of the groove in accordance with the light absorbing character of the face plate. That is, the groove is made shallower for darker materials and deeper for lighter-colored materials.

To assure effective removal of the apertures or spots from view, it is preferred that the deep grooved outlet strip, and the primary source of light in the room (desirably all sources of light in the room) be located in a particular relationship to one another such that the shadow formed by the light source within the groove acts to effectively shade the rear apertured wall of the groove from direct illumination by the source. More specifically, the outlet strip is located at a relatively low point on a wall of a room, such as at the baseboard, and the light source is positioned relatively high, as at the ceiling, so that the light from the source must come downwardly toward the outlet strip and its grooves at a very substantial inclination to the horizontal. The grooves are then formed deeply enough that light rays coming directly from the source into the grooves can fall only on the bottom walls of the grooves, and not on the rear apertured walls of the grooves, to attain the desired shading and aperture elimination effects.

Visual elimination of the apertures may be further enhanced by special treatment of at least one and preferably all of the walls of the grooves in a manner rendering them less capable of reflecting light than are other portions of the face plate offset from the groove, and for best results giving whatever capacity there is for reflection of light by the groove walls a more diffuse and less specular characteristic than occurs at other points on the face plate. Structurally, these results may be achieved by painting or otherwise coloring the grooves a deep black or other dark color, desirably having a matte finish.

The invention further encompasses improved face plate assemblies for continuous electrical outlets of the type described. One feature resides in the disposition of longitudinal locking ridges along the inner side walls of the face plate, such that the remainder of the assembly may be locked in place in positive fashion. Preferably a material of generally rigid but resilient character is used, and sufficient thickness is employed in the front face element to provide adequate impact resistance for all reasonable circumstances.

Still another feature of the invention, for removing the apertures from sight, relates to the preferred provision of rupturable membranes in the prong receiving openings, to definitely block off or close the apertures until a user decides to purposely pierce one pair of apertures for reception of a plug. At that time, the mere act of inserting the plug into position within the outlet automatically ruptures the two membranes in the particular set of apertures selected, while leaving the other membranes in closed condition for visually eliminating the apertures.

As stated at the outset, the deep grooves of the present invention serve more than one advantageous purpose. Besides the safety and aesthetic purposes dis-

cussed above, the deep grooves also have a mechanical advantage in greatly facilitating the insertion of a plug into the outlet strip, by forming guiding grooves on the surface of the face plate which are deep enough to effectively direct and guide the prongs of the connector plug along the surface of the face plate and into a pair of prong receiving apertures. In order to connect a plug into a pair of the apertures at a desired location, a user merely inserts the two prong ends into the grooves at that location and then shifts the plug laterally within the grooves until the prongs reach a position at which they can enter one of the pairs of apertures.

To assure an effective guiding action of the discussed type, it is necessary that the grooves have a depth of at least a certain minimum value. This is true because of the manner in which the outer extremities or tapered ends of the prongs of a conventional connector plug are formed. In particlular, these prongs have at their outer ends a rather abruptly tapered or rounded end portion, which must be completely received within the grooves of the present outlet strip in order to assure proper lateral guiding results. Stated differently, the depth of the grooves must be at least as great as the length of the tapered end portions of the prongs. If this relationship is not maintained, then the angularly disposed tapered surfaces on the prong ends function as camming surfaces or camming edges which inherently act to cam the prongs out of the grooves if the user happens to slightly turn the plug, so that the grooves in effect lose substantially their entire effectiveness as guides. With regard to actual dimensions which are preferred to enable the grooves to best serve their guiding function, it is found desirable that for effective use with most plugs, the grooves have a depth greater than their width, with optimum results being attained when the depth of each groove is at least about one and one-half times the groove width. In accordance with another aspect of the invention, superior guiding of connector prongs into engagement is facilitated by making the prong-receiving apertures the same in height as the grooves in which they are located.

In a different aspect of the invention, the electrical outlet is configured to receive connector prongs in virtually arbitrary locations along its length. The prong-receiving openings comprise elongated slots coextensive with the grooves for a considerable length and separated by web elements providing structural integrity and rigidity.

The above and other features and objects of the present invention will be better understood from the following detailed description of the typical embodiments illustrated in the accompanying drawing, in which:

FIG. 1 is a perspective view, partially broken away, of an electrical outlet strip constructed in accordance with the invention;

FIG. 2 is a transverse cross-sectional view through the outlet strip, taken on line 2—2 of FIG. 1, and showing the internal construction of the strip;

FIG. 3 is a transverse cross-sectional view similar to FIG. 2, but taken in the plane of one of the sets of plug receiving openings, with a plug shown in position;

FIG. 4 is a greatly enlarged fragmentary cross sectional view, showing one of the grooves of the face plate with a prong of an associated electrical plug received in the groove in guiding position;

FIG. 5 is a section taken on line 5—5 of FIG. 4.

FIG. 6 is a somewhat diagrammatic representation of a room installation showing the relationship between the main source of light in the room and the outlet strip;

FIG. 7 is a view similar to FIG. 5, but showing a variational form of the invention; and

FIG. 8 is a fragmentary view similar to FIG. 1, but showing yet another device in accordance with the invention.

In FIG. 1, the electrical outlet strip is indicated generally by the arrow 10, and includes a channel housing 11 closed at the front by a face plate 12. Preferably, the channel housing 11 is a rolled sheet metal channel, of aluminum, steel, or the like, and the face plate 12 is constructed of an electrically insulating plastic which is easily extruded with a desired cross-sectional shape. The outer surface of face plate 12 contains two horizontal parallel grooves 13 and 14, and is provided with plug receiving openings 15, extending from the backs of grooves 13 and 14, at intervals spaced longitudinally along the outlet strip 10. An electrical connector plug 16 is shown inserted in one pair of the openings 15.

FIGS. 2 and 3 illustrate in cross section a typical inner construction for the outlet strip, which specific construction is disclosed fully and claimed in my co-pending application, Serial Number 44,172, filed July 20, 1960 on "Electrical Outlet Strip Assembly," now Patent No. 3,061,810.

The cross-sectional view of FIG. 2 reveals that the back wall 19 of channel 11 is provided with screw holes 20 allowing the outlet strip to be attached to an adjacent wall surface 120 by screws such as the one shown at 21. The face plate 12 is resiliently snapped into position in channel 11, being held in that position by resilient snap type interengagement of longitudinal shoulders or ribs 22 and 23 on channel 11 within grooves 24 and 25 formed in and extending along the opposite sides of face plate 12. In a generic sense, the shoulders and grooves may be located on the channel 11 and face plate 12, respectively, as illustrated, or vice versa. However, it is preferred to roll the channel 11 with internal longitudinal shoulders formed just inside each side of the channel opening, by inward displacement of the side wall metal of channel 11, as illustrated at 22 and 23, while the grooves 24 and 25 are recessed into the edges of the face plate 12.

The face plate 12 is substantially rigid, but at the same time resilient. These properties may be obtained along with the desired insulating properties by using a suitable polyvinyl chloride approximately 0.090" thick. When so constructed the face plate 12 has sufficient impact resistance to withstand all reasonable abuse encountered from cleaning equipment and the like.

Inside of the housing formed by the channel 11 and face plate 12, there are provided two contact strips 26 and 27 contained within an insulating receptacle 28. Elements 26, 27 and 28 are preferably co-extensive longitudinally with face plate 12, with all of these parts including plate 12 having the vertical cross section represented in FIG. 2 continuously along their length, except where the cross section of face plate 12 is interrupted by the provision of plug receiving apertures 15. The insulating receptacle or inner housing 28 is divided longitudinally at its central plane by a central wall 29 into channels 30 and 31 which separately accommodate the two contact strips 26 and 27, respectively. The double channel electrically insulative receptacle 28, like the face plate 12, may be formed of an extruded insulative resinous plastic material, for example a suitable insulative vinyl resin.

The inner surface of face plate 12 is grooved to receive and support insulating receptacle 28, with a central groove 32 receiving the edge of central dividing wall 29, and rectangular side grooves 33 and 34 receiving mating edge flanges 35 and 36 formed along the edges of the side walls of inner housing 28. In assembly, the face plate 12 may be bent to receive the flanges 35 or 36 in the grooves 33, 34 or one extrusion may be fed onto the other lengthwise. In either event the inner housing 28 is positively united to the face plate 12. The major contact portion of contact strips 26 and 27 are rolled to an arcuate cross section, as seen clearly in FIG. 2,

to provide a convex contact surface for the electrical contact prongs or probes **17** and **18** of plug **16**. This arcuate curvature assures an effective sliding contact of the prongs with elements **26** and **27**, as seen in FIG. 3. The contact strips **26** and **27** are designed to flex from the position of FIG. 2 to the position of FIG. 3, at the point of insertion of an electrical plug **16** into a pair of the apertures **15**. This deflection of strips **26** and **27** by the plug prongs takes place about two longitudinal pivot shoulders **26***a* and **27***a* formed near the face plate edges of the contact strips **26** and **27** respectively, and seated on the adjacent wall surfaces of the central dividing wall **29** of the insulating inner housing **28**. Edges **26***b* and **27***b* of contacts **26** and **27** are folded back upon themselves to provide a stiff edge of double thickness, and are anchored by insertion into longitudinal retaining grooves **39** and **40** formed in the inner surface of face plate **12**. The deflectible edges **26***c* and **27***c* of contact strips **26** and **27** are rolled over to provide smoothly, sliding contact on the bottom surface of the double channel insulating receptacle **28**, when the insertion of plug **16** causes deflection of the adjacent portions of the contact strips **26** and **27** toward central dividing wall **29**. It will be apparent that strips **26** and **27** must be formed of resilient and electrically conductive material, such as spring brass or the like.

The outer channel element **11** may be of a length to extend entirely across the full width of one wall of a room, and may be connected through a corner fitting represented at **70** with another similar channel housing **11***a* of a second outlet strip **10***a* corresponding in every respect to the above-discussed first strip **10**. In this way, a series of the outlet strips **10** may extend entirely about the periphery of a room, with the contact strips **26** and **27** of successive outlets being connected to conduct current through the entire series of outlets. For feeding power to any of the outlet strips **10**, there may be provided at one of its ends a power outlet housing **72**, through which two leads **69** deliver power to a coupling block represented at **50** in FIG. 1. This coupling block may be received in an end portion of channel **11**, and serves to electrically connect the two power leads or wires **69** to contact strips **26** and **27** respectively. The specific structure of coupling block **50** forms no portion of the subject matter claimed in the present application, and therefore will not be discussed in detail. This coupling block structure is disclosed more fully in my above-discussed Patent No. 3,061,810. At the location of coupling block **50**, the forward side of channel **11** may be closed by a short cover plate **51**, having grooves **52** and **53** aligned with and dimensioned in correspondence with grooves **13** and **14** to form in effect continuations thereof. The electrical connections between the contact strips within the two units **10** and **10***a* may be formed by similar coupling blocks provided within corner section **70**, which may be closed at its forward side by a face plate **54**, also having grooves aligned with and dimensioned in correspondence with grooves **13** and **14**. The end of the final outlet strip **10***a* may be closed by a suitable closure plate represented at **71**.

With reference now to the specific configuration of the grooves **13** and **14** in the face plate **12**, it is noted first of all that these grooves are desirably of rectangular cross section (see FIG. 4), having parallel opposide side walls **73** and **74** extending perpendicular to the plane of the outer surfaces **75** of face plate **12**. The inner or back side of each groove **13** or **14** may be defined by an inwardly or rearwardly recessed surface **76**, extending perpendicular to said walls **73** and **74** and extending parallel to the plane of surfaces **75**. Apertures **15** commence at the plane of recessed wall **76**, and extend rearwardly through the material of face plate **12** to the back side **77** of the face plate. The apertures **15** have a width *w* transversely of grooves **13** and **14** which is not greater than the corresponding width of

the groove, and is located entirely within the groove width so that the groove will not have widened areas at the locations of apertures **15**. Desirably, the width *w* of each aperture **15** is exactly equal to and co-extensive with the corresponding width dimension of the groove, as seen clearly in FIG. 4. As represented in FIG. 5, the length *y* of apertures **15** is greater than width *w*, and in each case is slightly greater than the corresponding dimension of the prong **17** or **18** which is to pass through the aperture. In the example of FIG. 8, however, the length *y* is many times greater. The apertures formed in one of the grooves (for example groove **13**), may be somewhat narrower than the apertures **15** formed in the other groove (say groove **14**), so that these apertures will receive prongs of two different dimentions *x* (FIG. 5), as are found in a conventional polarized type plug.

The two parallel prongs **17** and **18** of plug **16** are of course formed of conductive sheet metal, typically brass, and normally have the usual standard thickness dimension (small *t* in FIG. 4), of .060 of an inch, plus or minus a standard manufacturing tolerance of .005 of an inch. Grooves **13** and **14** are made of a width slightly greater than this thickness of prongs **17** and **18**, to easily accommodate the prongs, and yet to confine them against excessive lateral movement. For example, the width of each groove **13** or **14**, between surfaces **73** and **74** in FIG. 4, typically may be between about .065 and .100 of an inch, and preferably between about .080 and .085 of an inch. The tip end portion **80** of each of the prongs **17** and **18** of plug **16** is tapered progressively and rather abruptly between point **81** and the very end surface **82** of the prong. In some plugs this tapered end portion of the prong has a curving configuration at **83** as it tapers inwardly, while in other plugs the taper is essentially straight rather than curved. In either instance, the inwardly tapering surfaces at **83**, inwardly beyond the point **81**, have a detrimental effect with respect to the guiding action of grooves **13** and **14**, unless the grooves are deep enough to completely confine the tapering surfaces or edges **83** within the grooves. That is, the depth of grooves **13** and **14** between the planes of surfaces **75** and **76** should be at least as great as, and preferably substatnially greater then, the length *l* of the tapered end portion **80** of each prong **17** and **18**, with this length being measured in the direction of the main longitudinal axis **84** of the prong. If the depth of the groove is less than the depth defined above, then a portion of one or both of the tapering sides **83** of end portion **80** of the prong will be able to engage one of the corners **85** at the outer edge of the groove (see FIG. 4), in a relation such that any tendency for the user to turn plug **16** about axis **86** of FIG. 3, or any other similar turning motion, will serve to cam the two prongs **17** and **18** out of their respective grooves **13** and **14**. As a result of such inherent camming action between the edges or surfaces **83** and **85**, grooves having a depth less than that discussed cannot effectively guide prongs **17** and **18** for their lateral movement and retain them against movement out of the grooves. When, however, the depth *d* in FIG. 5 is at least as great as, and preferably substantially greater then, the length *l* of tapered end portion **80** of the prong, this camming action cannot occur, and the plug prongs are therefore retained in the grooves so effectively as to perform properly the desired guiding function, for guiding the prongs along the grooves as they move laterally toward a pair of the apertures **15**.

It is further desirable, while still observing the above considerations, to modify the groove depths in accordance with the light absorbing characteristic of the material in the face plate **12**. Most elements **12** used for building installation will preferably have low reflectivity, such as a matte finish, and will be of soft hue. Thus light absorption will be largely dependent upon the shade

or darkness of the face plate 12. For darker materials the groove 13 may be shallower, without affecting the visual line effect by accentuating the apertures 14, 15.

Referring now to FIG. 6, I have illustrated in this figure a typical room within a building, with the outlet strip 10 of the present invention mounted to the side wall 120 of the room at a location near floor 91, and above and typically forming in effect a continuation of a base board 96. Strip 10 may extend entirely about the room, being interrupted only at the locations of doorways providing access between this and other rooms within the building. At a location well above the level of outlet receptacle 10, there is mounted in the room a light fixture represented at 94, this fixture typically being secured to the ceiling 90 of the room. The electrical fixture 94 may be the primary source of light within the room.

Light coming from source 94 directly to the location of outlet strip 10 follows a straight line path such as that represented at 95 in FIGS. 6 and 4, with this path being at the angle *b* relative to a horizontal plane passing through the receptacle. With reference particularly to FIG. 4, it is noted that such light entering each of the grooves 13 or 14, and following the straight line path 95, can impinge upon the bottom surface 74 of the groove through part of its depth inwardly toward surface 76, say for example to the point designated 97 in FIG. 4, but inwardly beyond that point the groove is entirely in shadow insofar as direct lighting from source 94 is concerned. Thus, the inner portion of surface 74 is shaded, as are the entire rear surface 76 and upper surface 73. This shading acts to reduce the illumination of rear surface 76 and the back portion of surface 74 so greatly as to cause surface 76 to appear substantially the same to the eye as do the dark apertures 15. The contrast between the completely dark apertures and the shaded rear surfaces 76 is sufficiently small to be substantially unnoticeable, so that the grooves appear to have a straight line effect, uninterrupted by apertures 15. To attain this result, the primary light source 94 in any room, and preferably all light sources within the room, are so located as to assure that all light coming directly from the sources is shaded against directly falling on the rear surface 76 as discussed above in connection with FIG. 4.

Under most circumstances, the outlet strip 10 is viewed from a location well above the level of the strip, such as the point designated 92 in FIG. 6, along a line such as that designated 93, at an angle *a* to the horizontal. Under this usual viewing condition, the very substantial depth of each of the grooves 13 and 14 is sufficient to completely block the rear wall 76 and its apertures 15 from sight, as will be apparent from a consideration of the positioning of the line of sight 93 in FIG. 4. Thus, unless the viewer sees the outlet strip from an unusual angle, the apertures 15 are hidden from view by this additional effect, stemming from the depth of the grooves.

Further advantageous results may be achieved by treating any one or all of the surfaces 73, 74 and 76 within the grooves to render them less capable of reflecting light than are outer surfaces 75 of the face plate 12. More specifically, the surfaces may be painted black or another dark color, darker than surfaces 75, to give to surfaces 73, 74 and 76 an average co-efficient of reflectivity (average coefficient for all light within the visible range, or for white light) which is substantially lower than the corresponding co-efficient of reflectivity of outer surfaces 75 above, beneath, and between the grooves. Also, any capacity which surfaces 73, 74 and 76 may have for reflection of light should be of a more diffuse character, and less specular character, than are the reflective characteristics of surfaces 75. In the optimum arrangement, surfaces 75 may be untreated natural surfaces of the resinous plastic material of which the face plate is formed (or may if desired be treated to increase their reflectivity and specularity and thereby reduce the definition of the groove in its contrast to the face plate), while surfaces 73, 74 and 76 may be striped black over their entire area during manufacture of the part.

In order to attain all of the results which flow from the use of deep grooves in the present device, it is found preferable that the grooves 13 and 14 have a depth *d*, from the location of corners 85, and for best results at least about one and one-half times as great as the width *w*. The arrangement presently considered as optimum is the one illustrated in the figures, in which the depth *d* is substantially equal to one and one-half times the width *w*.

In using the apparatus disclosed in FIGS. 1 through 6, a person may easily insert one or more plugs 16 into the outlet receptacle 10 at the location of any of the numerous pairs of apertures 15. Each plug is inserted by merely slipping the two prongs 17 and 18 into grooves 13 and 14 near the desired location, and then shifting the prongs laterally within the grooves until they fall into one of the pairs of apertures. If the prongs are of a polarized type, the wider prong is inserted in groove 14, to be received within the wider aperture 15. Even though the user exerts a turning force on plug 16 as he shifts it laterally, the plug cannot turn because of the effective confinement of prongs 17 and 18 within grooves 13 and 14. The formation of the grooves to be of at least a certain critical depth assures this effective guiding confinement of the tapered ends of the prongs within the grooves. Also, the depth of the grooves essentially hides apertures 15 from view, so that the device presents a very pleasing linear appearance uninterrupted by perception of spots or apertures at spaced locations. In addition, the elimination of visual perception of the apertures removes the pyschological tendency for children to insert screw drivers and other objects into the apertures. In connection with the appearance of the apertures, it is noted that in FIG. 1 the apertures have been illustrated only for illustrative purposes, to indicate the positioning of the apertures along grooves 13 and 14. In actuality, the apertures would not be visually perceptible from the angle illustrated, and the face plate 12 of the device therefore presents in appearance only two parallel straight line uninterrupted grooves.

FIG. 7 is a view similar to FIG. 5 but showing an arrangement in which the resinous plastic material (or other non-conductive material) of face plate 12*a* forms very thin frangible or rupturable diaphragms or walls 97 initially extending across and completely closing each of the apertures 15*a*. The walls 97 have a thickness and strength which are very small as compared with the thickness and strength of the main back wall 98 of the groove which forms the rearwardly recessed back wall 76*a* of the groove. Diaphragms 97 preferably extend parallel to front surfaces 75*a* of the face plate, and therefore lie in a vertical plane. Also, each of the walls 76 is here recessed rearwardly a short distance *s* behind the plane of surface 76*a* of the groove. The front surface of each wall 97 may be painted the same dark color as surface 76*a* and the other surfaces within the groove (corresponding to surfaces 73 and 74 of FIG. 4), to be less reflective than surfaces 76*a*, and to tend more than surfaces 75*a* toward diffuse rather than specular reflectivity, if there is any capacity for reflection by the groove surfaces.

In placing the device of FIG. 7 in use, it may be mounted in the same way discussed in connection with FIG. 6, with the rupturable walls 97 all initially in closed condition so that each of the grooves 13 and 14 presents a completely unapertured and therefore straight line appearance.

When a user desires to insert the prongs 17 and 18 of a plug 16 into the device, he first places the prongs within the two grooves of the unit, and then slides the plug laterally until the prongs fall into a pair of the shallow recesses provided in front of two of the diaphragms 97, by virtue of the rearward spacing *s* of these walls relative to

surfaces 76*a*. After the prongs fall into two such shallow recesses, the user may easily push the plug into full engagement with the receptacle, with the applying pressure serving to break through the engaged walls 97, while leaving all of the other walls 97, at the other apertures 15*a*, intact.

In the arrangement of FIG. 8, the widths *y* of each aperture 100 greatly exceeds the lateral dimension *w* of the groove. The individual apertures 100 are separated by webs 101 bridging the gap between the material defining the opposite walls of the grooves. Prongs for virtually all modern electrical appliances and equipment may be inserted anywhere along the apertures for the convenience of the operator, but the face plate retains adequate strength and physical integrity.

What is claimed is:

1. An electrical outlet adapted to form an electrical connection with a connector plug at any of numerous locations along the length of the outlet, said plug having two essentially parallel prongs with short tapering end portions at their outer extremities, said outlet comprising an elongated body structure having a generally vertical front wall structure and electrical contacts at the rear side of said front wall and engageable by the prongs of the plug, said front wall structure containing two generally horizontal parallel grooves in its forward side spaced to partially receive said two prongs of the plug and each defined at its back by a forwardly facing inwardly recessed surface containing spaced apertures for receiving said prongs, each groove having a depth in a direction normal to the plane of said forwardly facing inwardly recessed surface which is greater than the length of said short tapering portion of said prongs, said front wall structure having forwardly facing surface areas defining the major portion of the forward side of said front wall structure and offset vertically from said grooves, and each of said grooves having a surface area therein whose light reflecting characteristics are less specular than those of said forwardly facing surface areas offset vertically from said grooves.

2. An electrical outlet in accordance with claim 1 wherein each of said grooves is defined at its bottom and top by lower and upper side walls respectively, and wherein at least one of said side walls has a lower average coefficient of reflectivity for visible light than do said forwardly facing surface areas offset vertically from said grooves.

3. An electrical outlet in accordance with claim 1 wherein each of said grooves is defined at its bottom and top by lower and upper side walls respectively, and wherein said side walls and said forwardly facing inwardly recessed surface have a lower average coefficient of reflectivity for visible light than do said forwardly facing surface areas offset vertically from said grooves.

4. The combination comprising a continuous electrical outlet, and a connector plug adapted to form an electrical connection with said outlet at any of numerous locations spaced therealong, said plug having two essentially parallel prongs with short tapering end portions at their extremities, said outlet comprising an elongated body structure having a front wall structure and electrical contacts at the rear side of said front wall and engageable by the prongs of the plug, said front wall structure containing two parallel grooves at its forward side spaced to partially receive said two prongs of the plug and each defined at its inner side by a forwardly facing surface recessed inwardly beyond the adjacent portions of the front wall structure, said front wall structure having a series of spaced pairs of apertures extending from said recessed surfaces in the grooves rearwardly through said front wall structure to the back side thereof at locations to pass said prongs through the wall and into engagement with said contacts, each groove being defined at its top and bottom sides by upper and lower side walls respectively extending outwardly from said recessed forwardly facing surface to engage and laterally confine one of said prongs, the sides of the apertures lying flush with said upper and lower side walls, each of said grooves having a depth which is greater than the length of said short tapering end portions of said prongs.

5. An electrical outlet in accordance with claim 4 whereing said apertures contain thin walls initially closing the apertures and rupturable by said prongs upon insertion of the prongs into said apertures.

6. An electrical outlet in accordance with claim 4 wherein said upper and lower side walls of each groove have portions at a predetermined outer location near the entrance to the groove which extends into at least as close proximity to one another as do other portions of the side walls throughout a major portion of the depth of the groove inwardly, and wherein each groove has a depth which is at least about one and one-half times as great as the spacing between said upper and lower side walls at said predetermined outer location.

7. An electrical outlet in accordance with claim 4 wherein said apertures within the grooves have a dimension along the grooves which is at least many times greater than the dimension transverse to the length of the grooves, and wherein a plurality of web means are disposed transversely across and extend rearwardly from the forwardly facing surface of the grooves, spanning the grooves and structurally rigidifying the front plate.

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