June 1, 1965 G. L. WINDERS 3,187,290

OUTLET FOR A FLOOR DUCT

Filed Oct. 1, 1962

3 Sheets-Sheet 1

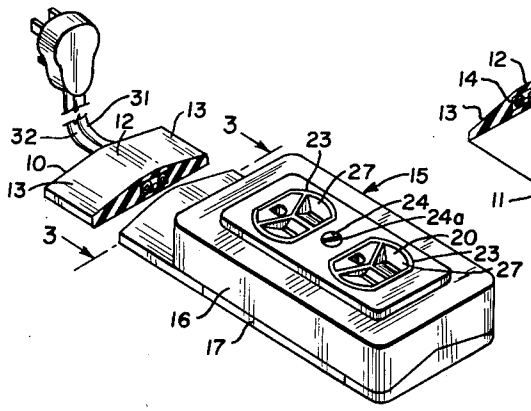


FIG. 1

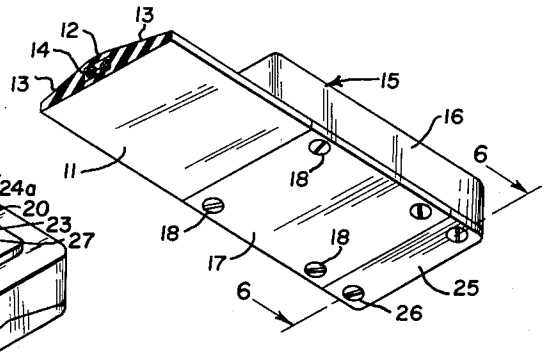


FIG. 2

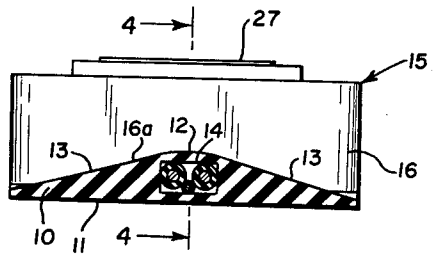


FIG. 3

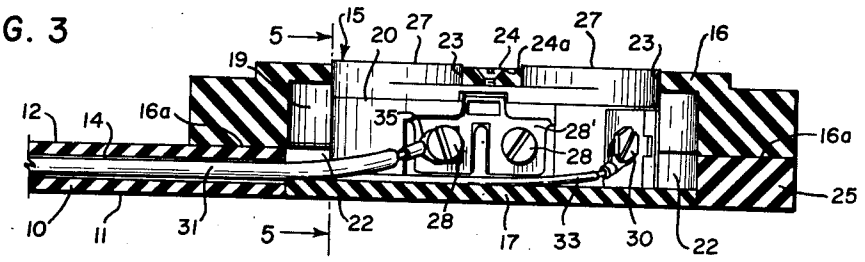


FIG. 4

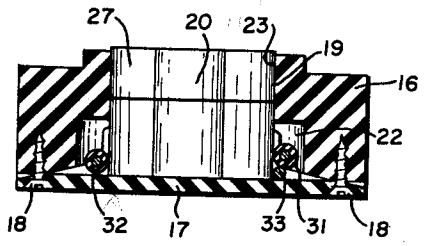


FIG. 5

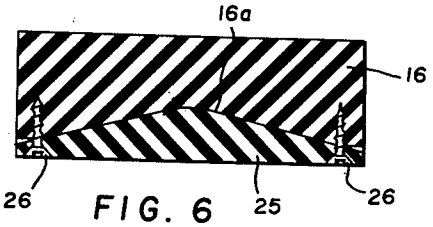


FIG. 6

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3 Sheets-Sheet 2

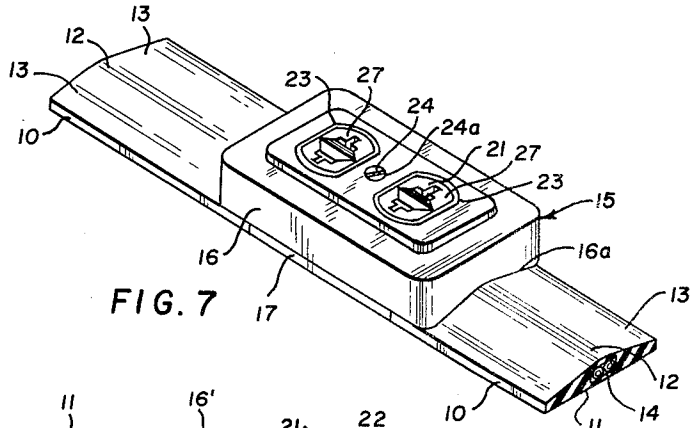


FIG. 7

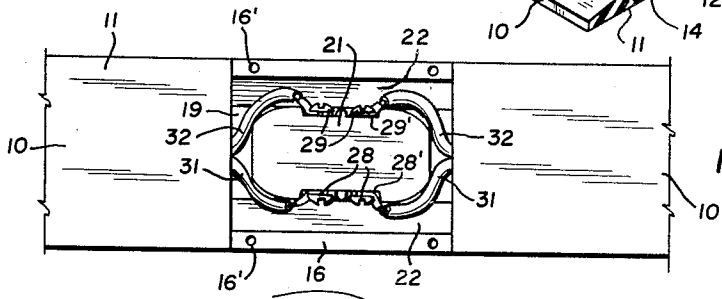


FIG. 8

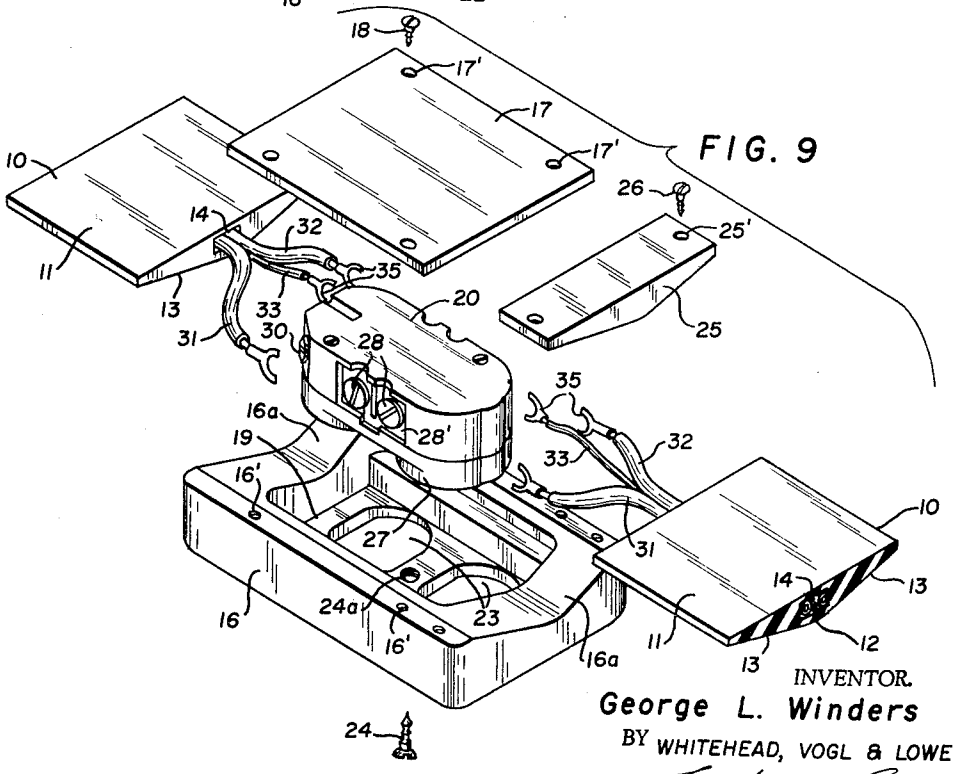


FIG. 9

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3 Sheets-Sheet 3

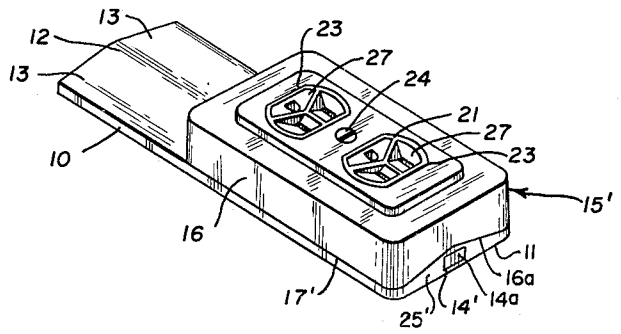


FIG. 10

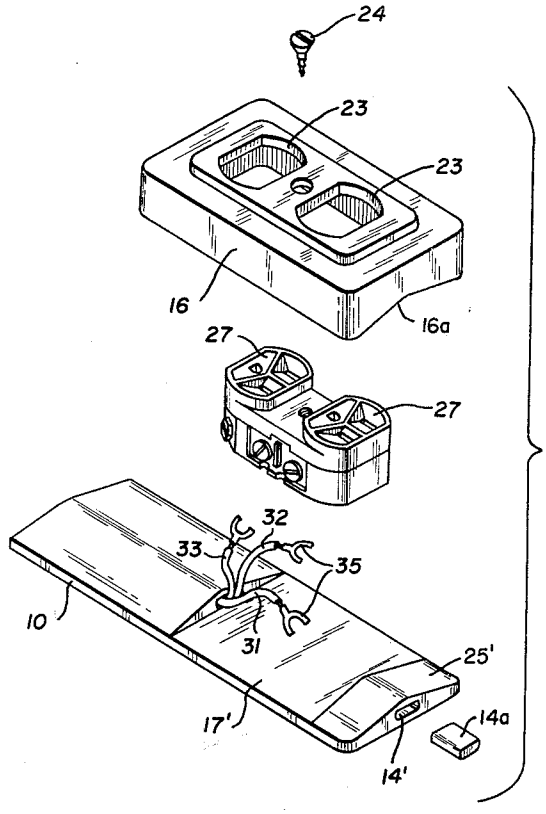


FIG. 11

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United States Patent Office

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OUTLET FOR A FLOOR DUCT

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Filed Oct. 1, 1962, Ser. No. 227,269
2 Claims. (Cl. 339—23)

This invention relates to electrical ducts and extension cords of the type especially adapted to be mounted upon a floor and more particularly to outlets for floor-type extension cords or, as hereinafter referred to, floor ducts. Especially, the invention relates to improved outlet housings for use in connecton with pre-formed floor ducts of the type which are adapted to be laid upon and affixed to a floor surface with the outlet being located at an end of a duct or at an intermediate position along the course of the duct.

The floor duct for which the improved outlet housing of the present invention is particularly suited, and which is briefly described hereinafter, is disclosed in the prior Patent No. 2,963,676, issued December 6, 1960. The present outlet is a development from and improvement over the outlet disclosed in that patent.

The primary object of the present invention is to provide a novel and improved outlet housing for a floor duct which is a neat appearing unit, which is easily connected to a floor duct and is compact, and which is particularly adapted to receive, house and protect a standard, double-socket type of outlet receptacle.

Another object of the invention is to provide a novel and improved outlet housing for a floor duct which is equally suitable for use as a terminal outlet of the floor duct or as an intermediate outlet of an extended floor duct.

Another object of the invention is to provide a novel and improved outlet housing for a floor duct which, in one arrangement, may be combined with a floor duct as a prefabricated factory-finished assembly of specified proportions to comply with rigid standards of safety imposed by Underwriters Laboratories, Inc. and which in another arrangement is equally well adapted to be furnished to an ultimate user as unassembled components which are easy and simple to assemble to permit the user to form an electrical floor duct assembly according to his special needs.

Another object of the invention is to provide a novel and improved pre-molded outlet housing for a pre-molded floor duct which is adapted to be connected to a terminal end of the floor duct or to opposing ends of a continuous array of ducts to form a unitary structure therewith in a simple and easy manner, and without the necessity of special cutting and fitting operations to effect the interconnection of the housing with the duct or ducts.

Another object of the invention is to provide an outlet housing for floor duct which is substantially an open-bottom shell of tough, resilient, insulating material, suitably formed to receive and hold a conventional two-socket outlet with the outlet connecting sockets being accessible at openings through the top of the shell, with longitudinal passageways in the shell at each side of the outlet to accommodate connecting leads emerging from associated floor ducts and with a simply-formed bottom plate of insulating material to enclose the unit.

A further object of the invention is to provide a novel and improved floor-duct outlet housing combination which

is formed in a neat, compact manner and with the housing being of a tough, resilient, material and specially proportioned to protect the outlet therein from ordinary mishaps as where it is stepped upon.

With the foregoing and other objects in view, all of which more fully hereinafter appear, my invention comprises certain novel and improved constructions, combinations and arrangements of parts and elements as hereinafter described, defined in the appended claims and illustrated in the accompanying drawings in which:

FIGURE 1 is an isometric view of the topside of a floor duct and outlet housing having a two-socket, grounded type of outlet receptacle therein, the housing being affixed to the terminal of the floor duct, with the duct being transversely cut away to save space and also showing portions of lead wires having a conventional connector plug emerging from the distant end of the duct.

FIGURE 2 is an isometric view of the underside of the outlet and a portion of the duct illustrated at FIG. 1.

FIGURE 3 is a section as taken from the indicated line 3—3 at FIG. 1 but on enlarged scale and showing a transverse section of the duct and an end elevational view of the outlet housing.

FIGURE 4 is a longitudinal section as taken substantially from the indicated line 4—4 of FIG. 3 but with the conventional outlet structure and lead wires not being in section.

FIGURE 5 is a transverse section as taken from the indicated line 5—5 at FIG. 4.

FIGURE 6 is a transverse section as taken from the indicated line 6—6 at FIG. 2 but on an enlarged scale to appear similar to FIG. 5.

FIGURE 7 is an isometric view similar to FIG. 1 but looking down upon a housing having a two-socket, ungrounded outlet and with the housing being interposed between and being affixed to two opposing ends of floor ducts to form a continuous duct system.

FIGURE 8 is a bottom plan view of the structure of FIG. 7 with the bottom plate of the housing being removed to show constructions otherwise hidden from view.

FIGURE 9 is an upside-down exploded isometric view of the elements illustrated at the other figures and illustrating a two-socket, grounded outlet, the housing, fragmentary end portions of aligned, wire-carrying floor ducts which may be connected thereto, a floor plate, and an end plate which may be used in lieu of one of the ducts if the outlet is intended to be a terminal outlet of a single floor duct.

FIGURE 10 is an isometric view similar to FIG. 1, but illustrating the outlet housing as being mounted directly over a terminal reach of floor duct as in a modified manner which is especially suitable for factory assembly of the unit as will be hereinafter described.

FIGURE 11 is an exploded isometric view of the elements illustrated at FIG. 10 to better illustrate the manner in which the elements are prepared prior to their assembly into the unit illustrated at FIG. 10.

The housing for a pre-molded floor duct which constitutes the primary element of the present invention was developed to meet the need for an improved electrical outlet in a floor duct and especially to permit in such an outlet, the use of a conventional, low-cost outlet receptacle.

Also, for one type of use of floor ducts, the housing is

adapted to speed and simplify the assembly of floor duct units. In prior constructions, as illustrated in the patent hereinbefore referred to, the formation of an outlet required actual slotting as by milling, a considerable length of the upper portion of the duct to provide a seat for the outlet and its housing. The improved housing is also adapted to be affixed to a floor duct in this manner, and such is especially desirable for prefabricated factory-assembled units which must be manufactured according to strict specifications to meet approval of the Underwriters Laboratories, Inc. However, the improved housing is further adapted to be affixed to the identical floor duct in a more simple maner, as where the duct is simply transversely severed and the outlet housing is attached to a short overlap of the severed end of the duct. This arrangement is especially desirable for customer-assembled units, as where the customer purchases the components of a unit and assembles them himself in situ to meet his particular needs.

The outlet housing is transversely and longitudinally symmetrical, and thus may be located at the end of a duct or at an intermediate location by either mounting the housing over a milled-out portion of the duct or by connecting the housing to an end or to opposing ends of aligned duct sections as a continuous assembly. Plainly, in the present invention, not only is the selective installation of one or more outlet housings made simpler but, in a floor duct it is much less costly, either as a factory-assembled unit or as a customer-assembled unit, for the present housing is suited to be produced by conventional molding operations and to acccommodate a low-cost, mass-produced, conventional, two-socket outlet receptacle complete with the terminal, wire-connecting posts.

Referring more particularly to the drawing the improved outlet housing, hereinafter described in detail, is especially suited for use with a flat, ribbon-like floor duct **10**. This duct is made as a continuous longitudinal strip of resilent, tough insulating material such as rubber. It is formed with a flat bottom **11** and a crowned upper surface having a central longitudinal ridge **12** with lateral aprons **13** sloping from each side thereof. The thickness of this duct at the crown is sufficient to provide a longitudinal passageway or conduit **14** through it to accommodate electrical lead wires. The outlet housing assembly, hereinafter described in detail, may be connected to an end of the duct in a manner especially suitable for a customer-assembled unit **15**, as illustrated at FIGS. 1–9 or it may be mounted over a milled out portion of the duct as a factory-assembled unit **15** as illustrated at FIGS. 10 and 11.

Referring specifically to the units illustrated at FIGS. 1–9, which will be first described, the improved outlet housing assembly **15** is connected to the conduit **10** and is adapted to contain a conventional outlet as hereinafter described. It is formed about a symmetrical open-bottom shell **16** which is closed by a rectangular bottom plate **17**. This plate is detachably affixed to the underside of the shell as by screws **18** at each corner of the plate to provide access for assembly and inspection of the components within the shell. This bottom plate **17** is a rigid insulating material of a suitable synthetic resin.

In preferred construction, the shell **16** is made of a tough resilient type of rubber having substantially the same resilience and toughness as that of the duct **10** and of a material sufficiently similar to the duct to permit them to be tightly adhered together by an adhesive. In form, the shell **16** approximates a shallow rectangular box which is longitudinally and transversely symmetrical. This box is nearly twice as long as it is broad with the vertical corners being preferably rounded to improve the appearance of the unit. Also, the top surface is stepped to form a low plateau-like shelf at the center portion thereof.

The underside of the shell is open to expose a longitudinally-extended interior chamber **19**, as clearly illustrated at FIG. 9, and this chamber is adapted to snugly receive and hold the body of a conventional two-socket, grounded outlet receptacle **20** illustrated at FIG. 9 or an ungrounded receptacle **21** illustrated at FIG. 8. Also, the walls of the chamber **19** are rabbeted along each longitudinal side to form lnogitudinal side troughs **22** with a trough being at each side of the chamber **19** for the accommodation of lead wires emerging from one or more floor ducts and connecting with the standard terminal posts at the sides of the receptacle.

The top of the shell is formed with a pair of openings **23** to snugly receive the standard socket turrets of the receptacle, hereinafter described, and render the sockets accessible from the outside of the shell. Also these openings position the receptacle in the shell and prevent longitudinal shifting of it in the chamber **19**. To lock the receptacle in place, a screw **24** is passed through a central opening **24***a* in the top portion of the shell between the openings **23**, as clearly shown at FIGS. 4 and 7, the screw being turned into centered threaded hole in the receptacle, not shown, which is provided for in any conventional two-socket outlet receptacle.

This shell is substantially longer than the receptacle itself and each longitudinal end portion beyond the chamber **19** and troughs **22** is formed as a thickened end wall having its underside notched or arched to a concaved form **16***a* to register with and nest upon the top surface of a short reach of a transversely-cut end portion of a floor duct **10**. It follows that by proper selection of an adhesive a relatively short end portion of the duct **10** may be affixed to the shell by overlapping the portion **16***a* onto the duct.

It is to be noted that in the FIGS. 1–9 arrangement the intermediate portion of the underside of the shell **16**, which opens into the chamber **19** and the lateral troughs **22**, is not covered by an extended portion of a floor duct **10**. Also, that the undersurface **11** of the duct or ducts, is spaced below the undersurface of the shell a short distance since the shell sits upon the top of the duct, or ducts as the case may be. This is especially illustrated at FIG. 8 wherein the bottom plate **17** has been removed and at FIG. 4 where the bottom plate fills the gap below the bottom of the shell with the bottom of the plate **17** being aligned with the bottom **11** of the duct **10**. To facilitate attaching this bottom plate **17** to the shell, the corner holes **17'** are provided in the plate **17** and guide holes **16'** are provided in the side wall of the shell to receive the four screws **18** by which the plate **17** is normally affixed to the underside of the shell.

The shell **16** is purposely symmetrical in form, and with an arched undersurface **16***a* at both ends thereof. It is immediately manifest that a single duct **10** can be affixed to one end of the shell to form a terminal outlet or that ducts **10** can be affixed to both ends of the shell to form an intermediate outlet of a continuous conduit, as illustrated at FIG. 7. However, when the unit is used to form a terminal outlet of the duct, it is necessary to enclose and seal the longitudinal end of the housing distant from the associated duct. An end closure **25** is provided for this purpose and may be regarded as an optional part of the housing, to be discarded when the outlet is at an intermediate location in a continuous duct arrangement, but to be used when the outlet terminates the duct. This short end closure **25** is in appearance similar to a short transverse portion of the floor duct **10** but without any passageway through it. This end closure **25** is preferably formed of a hard resin material the same as the bottom plate **17** and it is fastened to the shell **16** in a similar manner. Suitable screw holes **25'** are provided at each end so that it may be detachably affixed to the undersurface of the shell **16** as by screws **26**, as clearly illustrated in FIGS. 2 and 6.

The shell **16** is especially adapted for holding a conventional two-socket grounded outlet receptacle **20** or ungrounded outlet receptacle **21**. Each receptacle is formed generally as a box-like body having two upstanding socket turrets **27**. A pair of terminal posts is positioned at each side of the receptacle, the terminal posts being suitable flathead screws to permit tight connections with lead wires from either direction. Terminal posts **28**, at one side of the outlet, are turned into suitable threaded orifices in a bus bar **28'** forming a portion of that side of the outlet body and the posts **29** at the opposite side are turned into suitable orifices in a bus bar **29'** at that side of the body. The grounded receptacle **20** also includes a terminal ground post **30** at one end of the receptacle body.

In preparing the components for assembly, lead wires **31** and **32** are threaded through the conduit, or conduits, with connective tag portions of the lead wires extending beyond the transverse end of the duct **10**. In addition, when using the grounded receptacle **20**, a ground wire **33** is also threaded through the conduit **14**.

When connecting the receptacle as a terminal outlet, a lead wire **31** is connected to one of the posts **28** and the lead wire **32** is connected to one of the posts **29** while the ground wire, if used, is connected to the post **30**. If the outlet is intermediate with lead wires extending from ducts at each side of the receptacle two lead wires **31** are connected to the posts **28** and two lead wires are connected to the posts **29**, as in the manner clearly illustrated at FIG. 8. Also ground wires **33** are connected to the ground post **30** when the grounded receptacle **20** is used. It is to be noted that receptacles **20** and **21** are substantially the same except for use of the ground wire and when using the ground wire, the turrets **27** are altered in form to include three plug sockets instead of two in the grounded unit.

In further detail, the manner of assembly of this unit is suggested by the exploded view, FIG. 9. The floor ducts **10** are cut to any selected length allowing about one-half inch of each floor duct to underlie an outlet shell **16**. The lead wires **31** and **32** are extended from each end of a floor duct **10** with standard connectors **35** at their ends for quick and effective connections to their respective posts **28** and **29**. Before any connections are made, however, the ends of the floor duct **10** are glued in place against the mating surface **16***a* at each end of the shell. Next, the receptacle **20**, or **21**, is connected to the lead wires **31** and **32** and the ground **33**, if a ground is used, and the receptacle is pushed into the chamber **19**. It assumes a proper position with the turrets **27** extending through the openings **23** when the under surface of the receptacle is flush with the bottom of the shell **16**. Next, the receptacle is secured by the screw **24** and finally, the bottom plate **17** is positioned and fastened to the undersurface of the shell **16** with the receptacle resting upon this plate **17**. Where the outlet shell is at the end of a single floor duct **10**, the end closure **25** is also affixed to the undersurface of the shell as by the connecting screws **26**. With the closing-up of the shell by the plate **17** and end closure **25**, the outlet unit is ready for use.

It is immediately apparent that assembly of the unit illustrated at FIGS. 1–9 is a simple, quick matter and does not require any special skills or tooling. The duct **10**, the wires **31**, **32**, and **33** and outlet assembly **15** may thus be shipped as separate components and assembled by the customer at the point of final installation with outlets being spotted in the duct at selected locations. Accordingly, this unit illustrated at FIGS. 1–9 is especially suitable as a customer-assembled unit.

The unit illustrated at FIGS. 10 and 11 includes a modified outlet assembly **15'** which is better adapted for factory assembly. In this arrangement the outlet shell **16** is used without modification. Likewise the receptacle

20, or **21**, is used the same as hereinbefore described and is adapted to fit into the outlet shell with the turrets **27** extending through the openings **23** and with the lock screw **24** holding the receptacle in place.

However, the bottom plate **17** and the end closure **25** are eliminated and the duct **10** is modified to close the underneath portion of the shell **16**. The portion of this duct **10** which is to lie underneath the shell **16** is prepared for this purpose by cutting away the crown of the duct to provide a floor **17'** below the passageway **14** opening. The uncut duct at each side of this floor underlies an end portion **16***a* of the shell, as hereinbefore described, with a short uncut portion forming a closure **25'** at the end of the conduit where the outlet terminates the duct.

Since the passageway **14** exists in this conduit, the end closure **25'** is thus open as at **14'** and a plug **14***a* is required to fill this opening. This plug may be of a rubber or plastic material of any type which can be permanently affixed in place by an adhesive.

This factory-assembled unit with the improved shell can be manufactured in specified lengths such as 4, 5, 6 and 10-foot lengths and thereby meet the strict standards of safety and reliability imposed by Underwriters Laboratories, Inc. for their approval. The approval of Underwriters Laboratories, Inc. clearly demonstrates the commercial worth of this improved unit.

While I have now described my invention in considerable detail, it is obvious that others skilled in the art can devise and build alternate and equivalent constructions which are nevertheless within the scope and spirit of my invention. Hence, I desire that my protection be limited, not by the constructions illustrated and described, but only by the proper scope of the appended claims.

I claim:

1. In the combination of an outlet housing assembly including a shell adapted for prefabricated connection to the end of a flat ribbon-like, crowned floor duct having a longitudinal wire-carrying conduit at the crown portion thereof, and an electrical receptacle body having a pair of spaced apart shaped upstanding socket turrets projecting from its top surface and wire connecting posts on its sides for attachment of the wires from said conduit, the improvement in said shell for accommodation of said receptacle body, comprising:

said shell being fabricated of elastomeric insulating material and having a top wall having an inner and an outer surface, side walls depending from opposite ends of said top wall and side walls depending from opposite sides of said top wall;

said side walls and end walls being integrally connected and depending downwardly and terminating in bottom edges disposed beneath said top wall inner surface to thus circumscribe and define an internal chamber;

said top wall having a pair of spaced apart openings therein with said openings having a size and shape corresponding to that of said projecting socket turrets whereby when said receptacle body is disposed within said internal chamber, said socket turrets will be snugly received within said openings;

a pair of ledges disposed within said internal chamber on opposite sides thereof, extending the length of said side walls, and each being formed by a side face and a bottom face;

said ledge side faces being spaced inwardly from said side walls to provide therebetween a channel having a width corresponding substantially to that of said receptacle body, with said receptacle body being disposed within said channel when said outlet housing is assembled;

said ledge bottom faces being disposed in substantially coplanar relationship between said top wall inner surface and the bottom edges of said side walls, and

being adapted to support the wires extending from said conduit to said receptacle body connecting posts; and

cover means secured in underlying relation to said shell in contact with said side and end wall bottom edges for enclosing said internal chamber to maintain said receptacle body therein.

2. In the combination defined in claim 1, wherein the enclosing cover means includes a flat plate adapted to be affixed to the undersurface of the shell and having a thickness adapted to permit the bottom surface thereof to lie in a common plane with the bottom surface of the floor duct connected to the shell.

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