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SNAP-IN ELECTRICAL RECEPTACLE FOR A PANEL

Filed Aug. 11, 1966

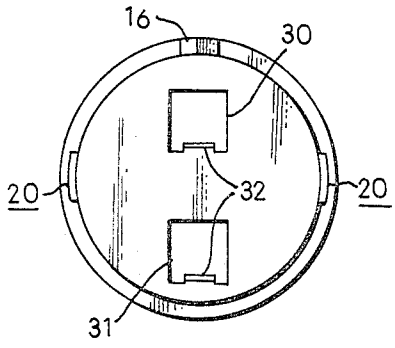


FIG. 3

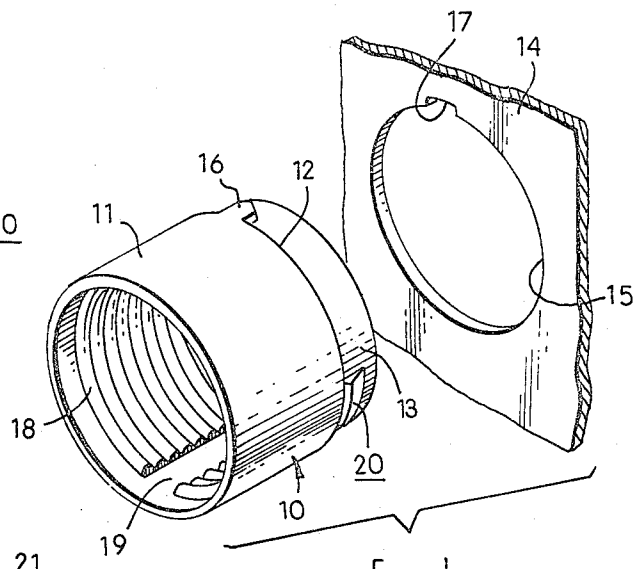


FIG. 1

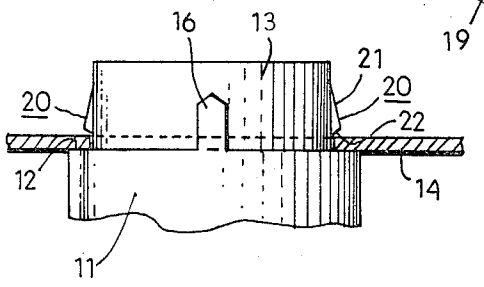


FIG. 2

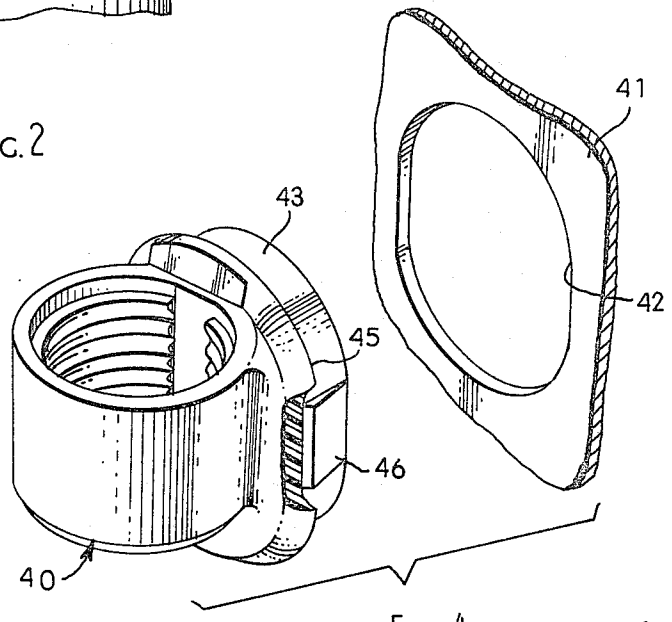


FIG. 4

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SNAP-IN ELECTRICAL RECEPTACLE FOR A PANEL

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ABSTRACT OF THE DISCLOSURE

A snap-in receptacle is provided with two triangular projections, each having one face that is long and sloped at a small angle and a second face that is short and sloped at a steep angle. These projections permit a rigid receptacle to be snapped into an opening in a panel.

The invention relates to a snap-in electrical receptacle for a panel, and particularly to such an electrical receptacle that is self-held in a panel aperture by a single snap-in operation.

Numerous electrical appliances, such as refrigerators or stoves, require an electrical receptacle for receiving a light bulb or for providing further electrical connections. Generally, the appliances are constructed of thin panels of sheet metal on which the receptacle must be mounted. Such appliances are also generally mass-produced in large quantities, so that all of the parts or elements which go to make up the appliance should also be capable of being mass-produced. Thus, the electrical receptacle and its mounting should be capable of being mass-produced. Further, an electrical receptacle having an integral insulating and mounting structure is preferred because it is strong, reliable, and easily manufactured. Previously, electrical receptacles have required a flexible piece or member in order that the receptacle can be mounted in a panel aperture, or have required a second piece or member to mount the receptacle in the panel aperture. Such requirements make the electrical receptacle relatively difficult and relatively expensive to manufacture. And, such electrical receptacles may not be reliable because of their flexible piece or member, or because their second piece or member may become loose through vibration.

Accordingly, an object of the invention is to provide an improved electrical receptacle that can be easily manufactured and easily mounted in a panel aperture.

Another object of the invention is to provide a snap-in type electrical receptacle that has an integral insulating and panel mounting structure.

Another object of the invention is to provide an electrical receptacle that is made of a single piece of relatively inflexible or rigid insulating material and that can be easily snapped into a panel aperture and reliably held.

In the manufacture of the appliance, the receptacle may not be added and wired until the appliance construction is complete. Therefore, it is frequently necessary or desirable that the receptacle be mounted and wired from one side of the panel without access to the other side of the panel.

Accordingly, another object of the invention is to provide an improved electrical receptacle that can be wired from one side of a panel and that can be snapped into the panel aperture from the same one side.

Briefly, these and other objects are achieved in accordance with the invention by a snap-in electrical receptacle that can be formed or molded as a single body or piece of relatively inflexible or rigid insulating material, such as a phenolic insulating material. The receptacle has an external aperture surface at its back end that is of the size and configuration that permits the receptacle to be inserted in a panel aperture with a small clearance. The receptacle is prevented from passing entirely through the panel aperture in the direction of insertion by a shoulder that surrounds all or part of the receptacle. Two integral snap-in projections are positioned on the aperture surface a short distance (corresponding to the panel thickness) ahead of the shoulder toward the back end. Each of these projections includes a relatively short incline rising (in a direction toward the back end) at a relatively large angle from the aperture surface near the shoulder, and a relatively long incline falling (also in a direction toward the back end) at a relatively small angle back to the aperture surface away from the shoulder. While these projections are integral with the receptacle and are relatively inflexible and rigid, they permit the receptacle to be easily snapped into the aperture from one side of the panel and reliably held between the shoulder and the two projections. At the front end, the receptacle may be provided with any sort of configuration such as a socket for a light bulb and terminals for electrical connections.

The invention will be better understood from the following description taken in connection with the accompanying drawing. The scope of the invention will be pointed out in the claims.

In the drawing:

FIGURE 1 shows a perspective view of one embodiment of a snap-in electrical receptacle in accordance with the invention;

FIGURE 2 shows a detailed side elevation of the shoulder and projection for mounting and holding the receptacle in accordance with the invention;

FIGURE 3 shows a view of the back end of the receptacle of FIGURE 1 and the structure for providing electrical connections thereto; and

FIGURE 4 shows another embodiment of the receptacle in accordance with the invention for a right angle mounting.

FIGURE 1 shows a receptacle **10** in accordance with the invention, this receptacle **10** being preferably made of a relatively hard, inflexible or rigid, and integral insulating material such as phenolic insulating material. The receptacle **10** of FIGURE 1 is a generally cylindrical-shaped body, and is intended to be mounted on a panel **14** having a circular aperture **15**. At the front end, the receptacle **10** has an outer cylindrical surface **11** of a diameter larger than the diameter of the panel aperture **15**. The outer surface **11** is broken by a shoulder **12** to provide an aperture surface **13** (at the back end) of a diameter that is small enough to permit the aperture surface **13** to pass through the aperture **15** with a small clearance. A key **16** may be provided on the receptacle **10** for engagement in a correspondingly shaped keyway **17** positioned in the panel **14** at the edge of the aperture **15** to prevent the receptacle **10** from rotating. The increased diameter of the surface **11** provided at the shoulder **12** prevents the front end of the receptacle **10** from passing through the panel aperture **15**.

In accordance with the invention, two similar projections **20**, preferably positioned at diametrically opposite points, are provided on the aperture surface **13** toward the back end. In FIGURE 1, only one of the projections **20** is visible. A detailed side elevational view of one of the projections **20** is shown in FIGURE 2. Each of these projections **20** comprises a relatively short front incline **21** which slopes outward toward the back from the aperture surface **13** at a relatively large angle, and a relatively long back incline **22** which slopes inward toward the back to the aperture surface **13** at a relatively small angle. The steep incline **21** begins or rises from the aperture surface **13** at a point spaced from the shoulder **12** toward the rear that is approximately equal to the thickness of the panel **14** in which the receptacle **10** is to be mounted. Thus, it will be seen that each of the projections **20** has a side profile that is triangular. The base of

the triangle coincides with the aperture surface **13**. The other two sides (**21**, **22**) form respective acute angles with the base and form an obtuse angle with each other at the top or vertex. The front and back inclines **21**, **22** are substantially plane surfaces that have a circumferential dimension or width (i.e., a dimension perpendicular to the plane of FIGURE 2) of any suitable distance. From experience, it has been found that a circumferential width less than the base length of the projections **20** is convenient and suitable for most applications. FIGURE 2 also shows the angles and dimensions of one projection which has been built and satisfactorily used for holding a snap-in light bulb receptacle for a 1.250 inches diameter panel aperture in a panel approximately 0.035 inch thick. The aperture surface **13** has a diameter of 1.245 inches. Each of the projections **20** extend radially beyond the aperture surface approximately 0.010 to 0.015 inch. The over-all or base length (from front to back) of each projection is 7/32 inch; the front incline **21** angle is 30 degrees; and the back incline **22** angle is 7 degrees. The projection **20** is spaced 0.035 inch to the rear of the shoulder **12**. In this receptacle, the circumferential width of each projection **20** is approximately 5/16 inch, or slightly more or less than the projection base length of 7/32 inch.

FIGURE 3 shows an end view of the back of the receptacle **10** of FIGURE 1. Two bosses or projections **30**, **31** are provided on the back, these bosses **30**, **31** having respective slots or apertures **32** for providing an opening through which electrical connections can be made to the receptacle. In FIGURE 1, it will be seen that the receptacle is provided with threads **18** which conform with national standard threads for lampholders. A groove or channel **19** is also provided to receive an electrical terminal that engages or contacts the threads of the lamp that is screwed into the receptacle **10**. And, though not shown, a second such electrical terminal is provided in the central interior of the receptacle **10** for engaging or contacting the center or base terminal of the lamp. The two receptacle terminals may be held in any suitable manned and may be of a known type which locks or holds a wire inserted into the slots or apertures **32** from the back of the receptacle **10**.

The projections **20** of the receptacle **10** are solidly and integrally formed with the receptacle **10** and are of relatively hard and rigid material. For the receptacle dimensions mentioned previously, the diameter between the highest points on the two projections lies between 1.265 and 1.275 inches, and the aperture diameter is 1.250 inches. It has been found that the two relatively long slopes **22** inclined at the relatively small angle permit the aperture surface **13** and projection **20** to be forced or snapped into the panel aperture **15**, but that the two relatively short slopes **21** inclined at the relatively large angle prevent the receptacle **10** from being withdrawn from the panel aperture **15**. In a typical installation of the receptacle **10**, the electrical terminals are mounted in or on the receptacle **10**. The wires for connection to the receptacle terminals are usually provided through the aperture **15** and may be connected and locked to the terminals by insertion into the receptacle slots or apertures **32**. The receptacle **10** with its wires is snapped into the panel aperture **15** by the receptacle back being pushed through the panel aperture **15** from the front until the projections **20** pass through the panel aperture **15** so that the receptacle **10** is held by the shoulder **12** on the front side of the panel **14** and by the steep or front inclines **21** on the back side of the panel **14**. The receptacle key **16**, of course, fits in the panel keyway **17** to prevent the receptacle **10** from rotating. Thus, the receptacle **10** is of solid and integral construction, can be mass-produced, and can be wired and mounted from one side of its panel. Since the receptacle can be made of a relatively rigid and hard material and still be snapped into a panel, it can be reliably held despite vibration.

FIGURE 4 shows another embodiment of the invention with a receptacle **40** arranged so that it mounts an electrical device, in this case another lamp, at right angles to a panel **41**. Also, FIGURE 4 shows a panel aperture **42** and an aperture surface **43** having an elongated shape so that the key **16** and keyway **17** of FIGURE 1 are not necessary to prevent rotation of the receptacle. The receptacle **40** also comprises a shoulder **45** and two oppositely disposed projections **46** (only one of which is visible in FIGURE 4). The receptacle **40** may have connections made to it in any suitable way and is mounted in the panel **41** as described in connection with FIGURES 1, 2, and 3.

It will thus be seen that the invention provides a new and improved receptacle for snap-in mounting in an panel aperture. Persons skilled in the art will appreciate that modifications may be made. The receptacle may house or hold various types of electrical devices besides a light bulb and may be connected by other types of terminals. Therefore, while the invention has been described with reference to particular embodiments, it is to be understood that modifications may be made without departing from the spirit of the invention or from the scope of the claims.

I claim:

1. A receptacle adapted to be snapped into a panel aperture of predetermined configuration comprising:

(a) a body formed of relatively hard, inflexible, and rigid insulating material;

(b) said body having an external aperture-conforming surface of said predetermined aperture configuration;

(c) a shoulder positioned around at least a portion of said external surface and extending outwardly therefrom a distance sufficient to prevent said shoulder from passing through said aperture;

(d) first and second snap-in projections symmetrically positioned on said external surface and spaced from said shoulder, each of said projections having a triangular configuration with the base of said triangular configuration coinciding with said external surface, with one side of said triangular configuration forming a first inclined surface rising from said external surface at a predetermined distance from said shoulder and at a relatively large angle and for a relatively short distance to a vertex, and with the other side of said triangular configuration forming a second included surface sloping from said vertex at a relatively small angle and for a relatively long distance to said external surface; and

(e) said body having means for making electrical connections thereto and for receiving an electrical device.

2. The receptacle defined in claim **1** wherein said first and second inclined surfaces are plane surfaces, and wherein the distance between said projection vertices exceeds the corresponding distance between the edges of said panel aperture.

3. The receptacle defined in claim **2** wherein said predetermined distance is substantially equal to the thickness of said panel.

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