Aug. 10, 1948. L. LUDWIG 2,446,709

PLUG TAP

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Fig. 1

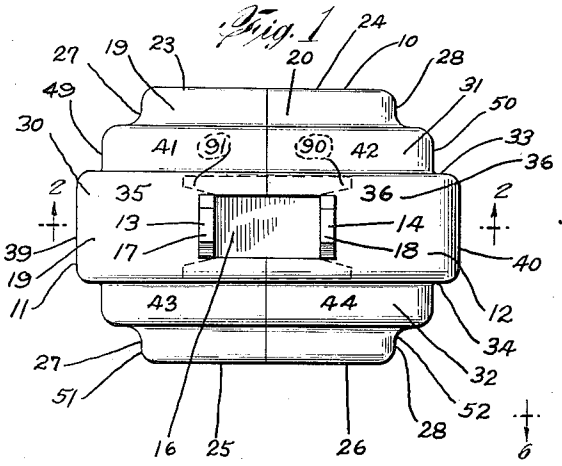


Fig. 2

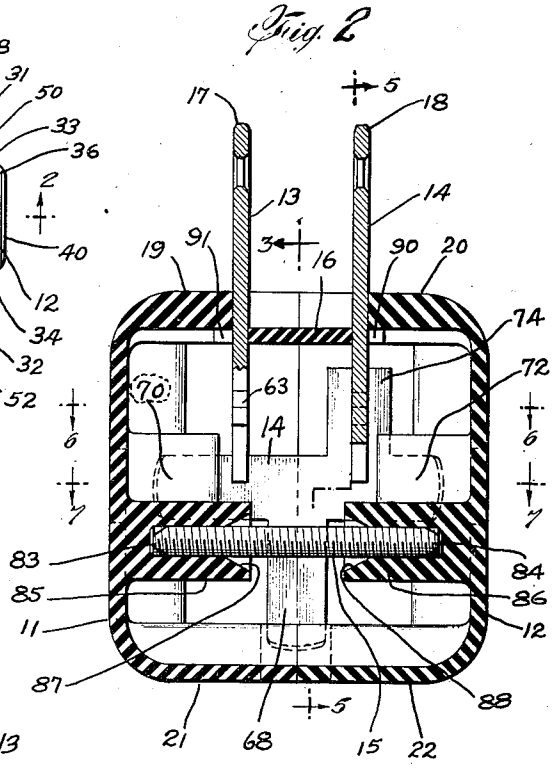


Fig. 3

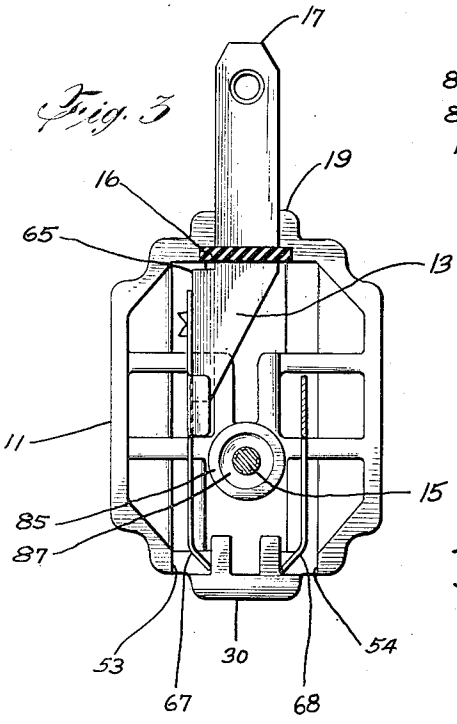
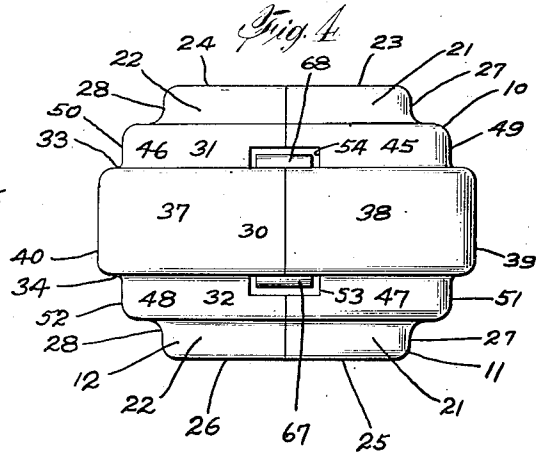


Fig. 4



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Fig. 5

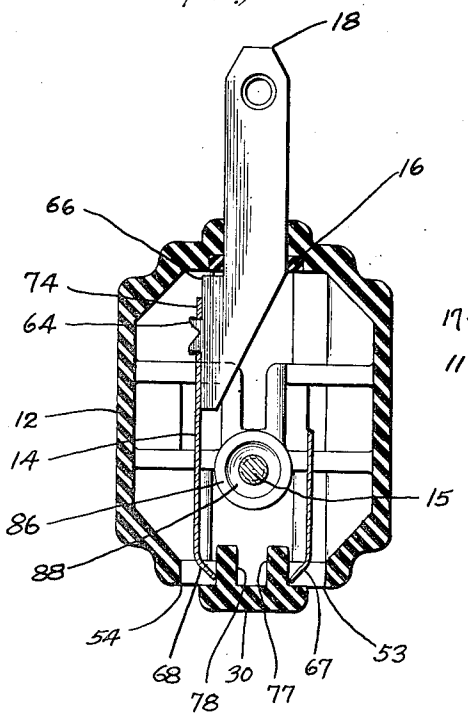


Fig. 6

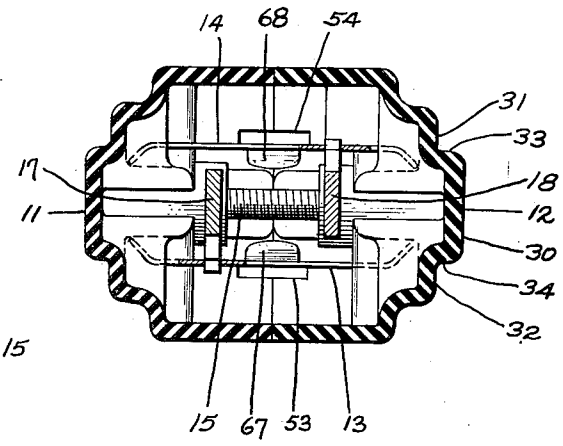


Fig. 7

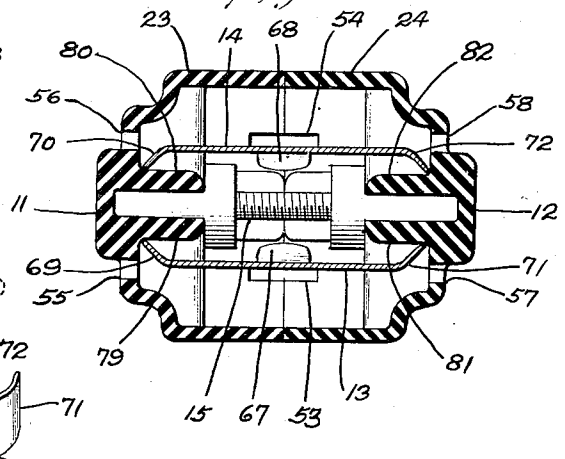
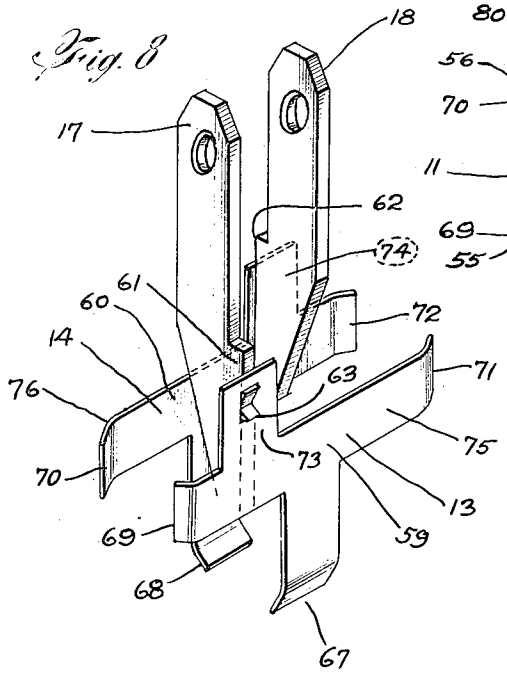


Fig. 8



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UNITED STATES PATENT OFFICE

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PLUG TAP

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2 Claims. (Cl. 173—334)

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This invention relates generally to electrical connection plugs, and more particularly to electrical connection plugs of a plural tap character in which the plug tap includes prong members adapted to engage a female electrical outlet and contact members associated with a plurality of female receptacles.

Among the objects of the present invention lies the provision of electric plug tap structure which is quickly and easily assembled in the course of the manufacture thereof to form a substantially permanent assembly.

The substantially permanent assembly of the present plug tap is advantageous for a number of reasons, among which are: The fact that the tap presents no exposed metallic parts, so that appearance is enhanced and shock liability is reduced to a minimum; the plug tap may not be disassembled by improper manipulation or by vibration; and, dangerous improper use of the plug is avoided since in normal use it is substantially impossible to make wire-end contacts with the internal contact members of the plug tap, except through openings provided for the purpose, but not by separating the plug body halves.

By virture of the fact that the structure which secures the body members together is completely concealed, the external characteristics of the body members may be fabricated from the point of esthetic appearance and receptacle opening location independently of other structural considerations.

A feature of the present invention lies in the arrangement of the female receptacle openings so that they may lie in a plane substantially perpendicular to the major flat surfaces of the prong members. This enables the use of a plurality of cube taps in a standard wall outlet so that each of the three receptacles or outlets in each of the cube taps may be utilized.

A further object of the present invention lies in the provision of a cube tap having the foregoing described advantageous characteristics and yet which uses a minimum amount of metal components. As will appear more fully hereinbelow, the contact members have the conducting tabs thereof formed from one piece of material instead of a plurality of pieces, as in conventional construction, and furthermore these conducting tabs do not have the terminals thereof bent over upon themselves as in prior constructions. In the improved construction herein disclosed, the conducting tabs of the contact member are rested against adjacent surfaces of the inside walls of the body member, so that a pressure contact is

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effected in coaction with the conventional prong members of known attachment plugs (not shown) and this pressure contact may have a long effective period of usefulness.

A still further object of the present invention lies in the provision of a cube tap of the character described wherein by virtue of the novel form, arrangement and coaction of the parts, economies in manufacture are accomplished with a resultant low cost and wide use.

These objects and other incidental ends and advantages will more fully appear in the progress of this disclosure and be pointed out in the appended claims.

In the drawings, similar reference characters designate corresponding parts throughout the several views of this embodiment.

Figure 1 is a rear elevational view of an electrical plug tap showing an embodiment of my invention.

Figure 2 is a sectional view as seen from the plane 2—2 on Figure 1.

Figure 3 is a sectional view partly in elevation as seen from the plane 3—3 on Figure 2.

Figure 4 is a front elevational view of the plug tap shown in Figure 1, as seen from the rear of Figure 1.

Figure 5 is a sectional view of the plug tap as seen from the plane 5—5 of Figure 2.

Figure 6 is a sectional view as seen from the plane 6—6 on Figure 2.

Figure 7 is a sectional view as seen from the plane 7—7 on Figure 2.

Figure 8 is a view in perspective, showing the contact elements in the positions they occupy in the assembled plug with the body members and fastening or securing element removed.

In accordance with the invention the plug tap generally indicated by reference character 10 includes a pair of juxtaposed body elements 11 and 12, a pair of juxtaposed contact elements 13 and 14, a fastening or securing element 15 and a spacer element 16. The contact elements 13 and 14 are maintained in operative positions by being nested within the body elements, the latter being interconnected by the fastening element 15, and the prong members 17 and 18 are maintained in proper spatial relation by the spacer element 16.

The body elements 11 and 12 are of substantially identical construction so that they may be fabricated in the same mold. The body elements 11 and 12 may thus have rear walls 19 and 20, front walls 21 and 22, top walls 23 and 24, bottom walls 25 and 26 and side walls 27 and 28. Each

of the front, rear and side walls is of a stepped external configuration best seen in Figures 1 and 4 and includes first, second and third outwardly projecting bands or flanges. The first outwardly projecting band or flange is generally indicated by reference character **30**, while the second and third bands or flanges are generally indicated by reference characters **31** and **32**. The outermost surfaces of the bands or flanges **31** and **32** are substantially coplanar and are disposed a substantial distance inwardly of the plug tap, that is to say, inwardly of the outermost surfaces of the band or flange **30**. The band **30** may be said to have upper and lower walls **33** and **34** respectively and these walls preferably merge into the outer surface of the band **30** which is substantially at right angles thereto by curving the intersections of said surfaces. The distance between the upper wall **33** and the lower wall **34** is substantially equal to or slightly less than the distance between the prongs of attachment plugs normally used with the device, said plugs not being shown. While the bands **31** and **32** are shown as extending outwardly from the outer surfaces of the front walls **21—22**, the rear walls **19—20**, and the side walls **27—28**, this is for the purpose of enhancing the external appearance of the device and making it easier to grasp for insertion or removal from a standard outlet.

Thus the bands **30**, **31** and **32** are formed by peripherally extending, projecting flange portions **35** to **52**, inclusive.

Located next to the band **30** at the upper and lower walls are three pairs of orifices, which are positioned to correspond to the respective positions of the contact members of the contact elements as will more fully appear. Since the walls **33** and **34** are separated from each other by a distance substantially equal to or slightly less than the distance between the prongs on a standard attachment plug (not shown), merely straddling the band **30** by such attachment plug, the prongs thereof may be slid around the tap **10** in any direction until the tips of the prongs of the attachment plug coincide with any one of the three pairs of orifices **53—58**, whereupon they may be directly inserted therein to make electrical contact with the contact members on the contact elements. The band **30** serves as an annular guide so that the prongs of the attachment plug may be tactually guided into place. Since there are no exposed electrically contacting parts on the tap **10**, the last mentioned operation may be performed in the dark with considerable facility and no danger.

Turning now to a description of the contact elements generally indicated by reference characters **13** and **14** and perhaps best seen in Fig. 8, the said contact elements are substantially identical so that detailed description of one will suffice for the other. Thus, the contact elements **13** and **14** include the prong members **17** and **18**, and contact members **59** and **60**. The prong members are of elongated shape preferably having tapered inner ends and laterally extending projections **61** and **62**. The projections **61** and **62** have the longitudinal surfaces thereof parallel to the axes of the respective prong members and are provided with integral deformable ears, **63** and **64**. The upper ends **65** and **66** of the projections **61** and **62** are adapted to and support the lower or inner surface of the spacer element **16** when the tap **10** is in assembled condition. The contact members **59** and **60** are of generally T-shaped configuration with a fourth tab eccentrically positioned on the cross bar of the T. The contact members **59** and **60**, therefore, have front contact tabs **67** and **68**, side contact tabs **69**, **70**, **71** and **72**, and inner contact tabs **73** and **74**. The contact tabs **73** and **74** are provided with orifices of suitable size and shape so that they may be penetrated by the deformable ears **63** and **64**, the latter being swaged over to rivet the contact members to the prong members. By virtue of the rectangular configuration of the orifices in the tabs **73** and **74** the contact members **59** and **60** are prevented from rotating about the deformable ears **63** and **64** in planes parallel to the outer longitudinal surfaces of the projections **61** and **62**. Each of the tabs **67—72** inclusive, is inwardly bent as best seen in Fig. 8 so that when the prongs of the attachment plug with which the tap **10** is used are inserted into any of the pairs of orifices **53—58**, the tips of the prongs on the attachment plug pass outwardly of the tabs **67—72** as the case may be and make contact with the outer surfaces **75—76** of the contact members **59** and **60**. The inner surfaces of the body elements **11** and **12** at those points where the ends of the contact tabs **67—72** will be located in the assembled plug tap **10**, are provided with inwardly directed ledges, **77—82**. These ledges not only serve to strengthen the body elements **11** and **12** since they act as reinforcing struts, but also support the tips of the contact tabs **67—72** so that when the prong members of an attachment plug (not shown) engage the outer surfaces of the contact tabs, said tabs have their bent ends flexed. This last described action not only provides a better electrical contact between the contact tabs and the prongs, but also prevents the contact members **59** and **60** from being undesirably distorted. Furthermore, undue stresses are not transmitted to the connection between the tabs **73** and **74** and the deformable ears **63** and **64** on the respective prong members **17** and **18**.

It may be noted in connection with the construction of the contact members **59** and **60** just described, that by virtue of the fact that they are each in one piece, the electrical resistance thereof is reduced and is more likely to remain constant than in the case of assembled groups of contact tabs. Furthermore, each of the contact members may be assembled to its respective prong member by only a single operation. This results in a more efficient and lower cost construction for the completed contact elements.

While the contact tabs **67—72** are shown as relatively smooth and curved, they may, of course, in accordance with well known practice, be provided with small projections which are adapted to have a snap action with the usual orifices in the prongs of the attachment plugs (not shown).

The two body elements **11** and **12** are maintained in proper position by the fastening and securing element **15**, which is in the form of an elongated pin or rod having a roughened surface. I have found that the fastening element **15** is preferably formed by a short length of threaded rod which is preferably provided with 30 threads per inch and in which the ends **83** and **84** tapered. The inner opposed surfaces of the body elements **11** and **12** are provided with inwardly extending juxtaposed cylindrical bosses having tapered entrances **87** and **88** which lead into the internal bores of said bosses which are of an effective diameter less than the effective diameter of the securing element **15**. I have found that the convergence of the entrances **87—88** is preferably 30° from the axis and that the effective diameter

of the element 15 should exceed the effective diameter of the bores in the bosses 85, 86 by approximately .005 inch. By virtue of the fact that the element 15 is completely enclosed in the finished plug tap, it is not externally visible and therefore, the symmetry of the tap is not affected by the eccentricity of positioning thereof with respect to the body elements 11 and 12. Another advantage which flows from this construction, moreover, is that the prong members 17 and 18 may be extended into the plug body a greater distance with a resultant increase in strength and security of the contact elements 13 and 14. A still further advantage which results from the present construction is that the element 15 cannot be reached from the outside of the tap 10 and so the tap cannot be disassembled in order to make direct wire connections to the contact elements 13 and 14 which would result in a hazardous operation of the plug tap and forbidden by the underwriters.

For the purpose of clarity in the present disclosure, one manner of assembling the plug is herewith given. The body member 12, let us say, may be placed upon a level surface. This may be visualized more easily if Fig. 2 is rotated through 90° so that the body element 12 is lowermost. Next the contact element 14 is placed within the body member 12. Following this, the spacer element 16, which is of H shape (see Fig. 1) is placed so that the legs 90 straddle the prong member 18. The spacer will be supported in an upright position thereat by reason of the fact that it stands between the inner surface of the rear wall 20 and the projection 62. Following this, the contact element 13 is placed in position with the prong member 17 disposed between the legs 91 of the spacer 16. Meanwhile, the contact tabs will be engaged by their corresponding ledges, as previously described. The element 15 is inserted under pressure into the boss 86 at any stage in the assembly. Finally, the body element 11 is placed so that the then exposed contact tabs may seat themselves therein and so that the then upper terminal 83 of the element 15 may enter the taper entrance 87. Pressure is then exerted axially of the element 15 and the two body elements 11 and 12 are brought into closed position. The pressure produces a wedging action between the element 15 and the internal bores of the bosses 85 and 86, which securely locks the two body elements 11 and 12 together.

It may thus be seen that I have provided a novel and useful plug tap commonly referred to as a cube tap, and which presents a symmetrical and clean appearance on the external surfaces thereof. Danger of shock or improper use is practically eliminated. Each of the sets of orifices associated with the contact tabs is accessible even when a plurality of plug taps are disposed next to each other in the standard plural wall receptacles. My improved plug tap is very convenient in use because the peripheral band acts as a locating medium to properly position the prongs on an attachment plug for insertion therein. The novel spacer element and its co-ordination with the body elements, permits the body elements to be closed with relation to each other from the "flat sides" of the prong members 17 and 18. The spacer element not only positions the prong elements with relation to each other, but is also

itself positioned with respect to the prong elements or body elements by the action of the other elements. Furthermore, the spacer acts as a closure to prevent entrance of foreign objects through the space between the prong elements.

By virtue of the eccentricity of the interconnection of the body elements, the prong members may connect with the contact members at the inner surfaces of the latter, with a consequently reduced size and weight of the prong members.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. In an electrical plug tap construction adapted to receive the prongs of a standard plug member in electrical attachment thereto, the combination of a main body having four contiguous walls angularly disposed with respect to each other, a pair of prongs extending from one wall thereof, a pair of laterally spaced prong receiving openings in each of the other three walls, said pairs of openings being in alignment, a continuous unbroken ridge raised above the outer surfaces of said three walls and disposed between the openings of all of said pairs of prong receiving openings, the width of said ridge being slightly less than the distance between the prongs of such standard plug member, whereby once the prongs of said plug member are positioned so as to straddle the said raised ridge they may be slidably guided therealong to facilitate insertion into the next pair of prong receiving openings to be reached.

2. In an electrical plug tap construction a pair of elements, each comprising a substantially flat prong member, and a contact member, said contact member comprising a one piece substantially flat main body portion of generally T-shaped configuration and a tab integral with and in the same plane as said main body portion, said tab being eccentrically positioned on the cross bar of the T and extending in the opposite direction from the third leg of the T, and means for fastening said prong member to said tab whereby the plane of said prong member is substantially at right angles to the plane of said contact member.

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