

United States Patent [19]
Clement

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[54] POWER TAP FOR CONTINUOUS OUTLET
DUCT

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[51] Int. Cl. **H01r 3/06**

[58] Field of Search **339/20, 21 R, 21 S, 22 R,
339/22 T, 23, 24, 14 R; 200/51 R, 51.07**

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Primary Examiner—Robert L. Wolfe

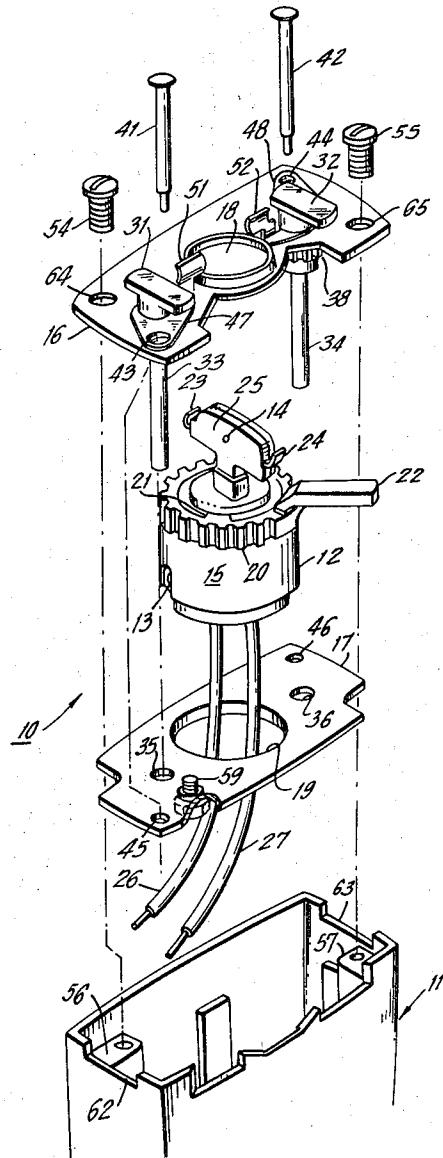
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[57] ABSTRACT

Removable device for tapping power from a continuous outlet duct having a stylized extruded housing is constructed with gear elements interconnecting the contact carrier and two mechanical retaining elements. A single manually operated lever is provided to operate the gear elements to simultaneously make electrical and mechanical holding connections between the power tap and the duct. Appropriately located spring fingers mounted to the power tap contact the duct housing to provide a positive ground connection, and cooperating polarizing formations of the power tap and duct protect against the making of improper electrical connections.

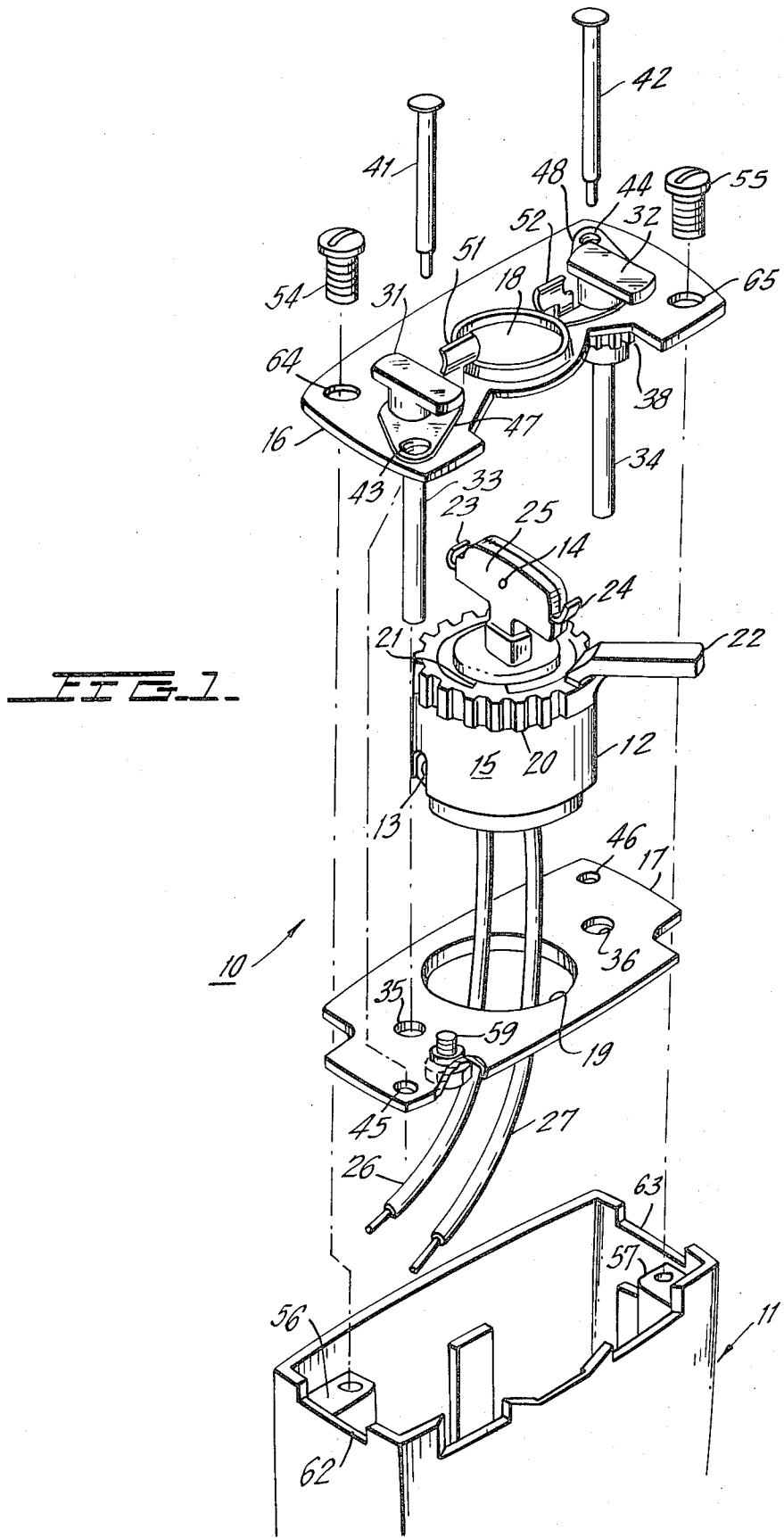
11 Claims, 7 Drawing Figures



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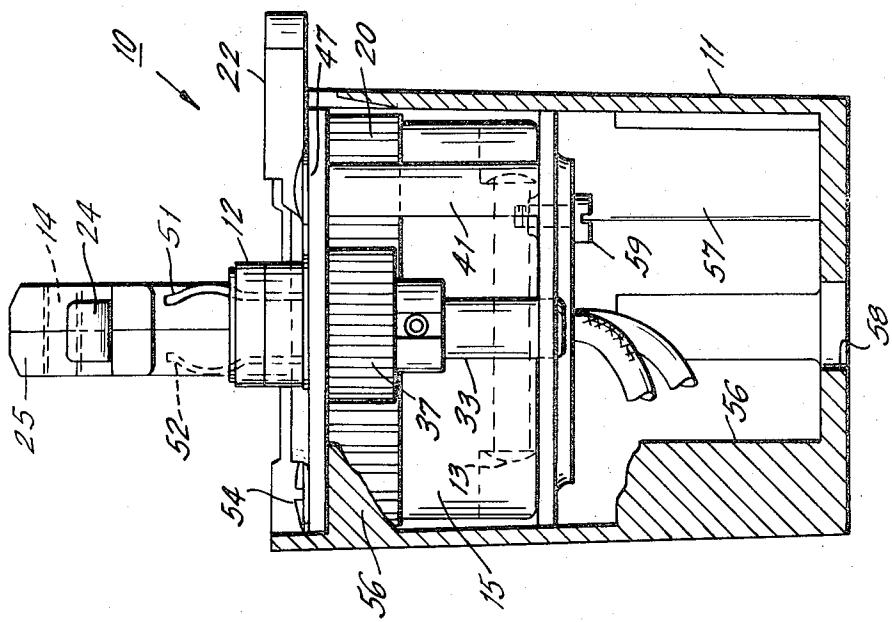


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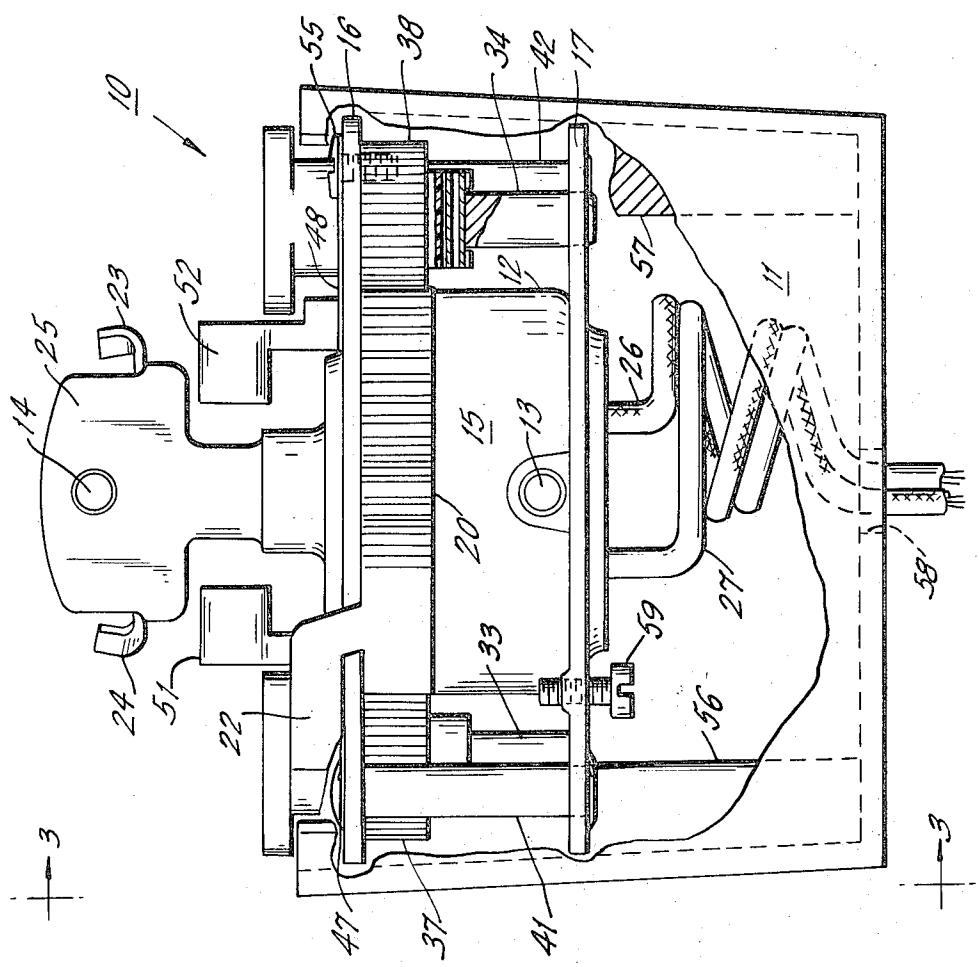
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FIG. 5

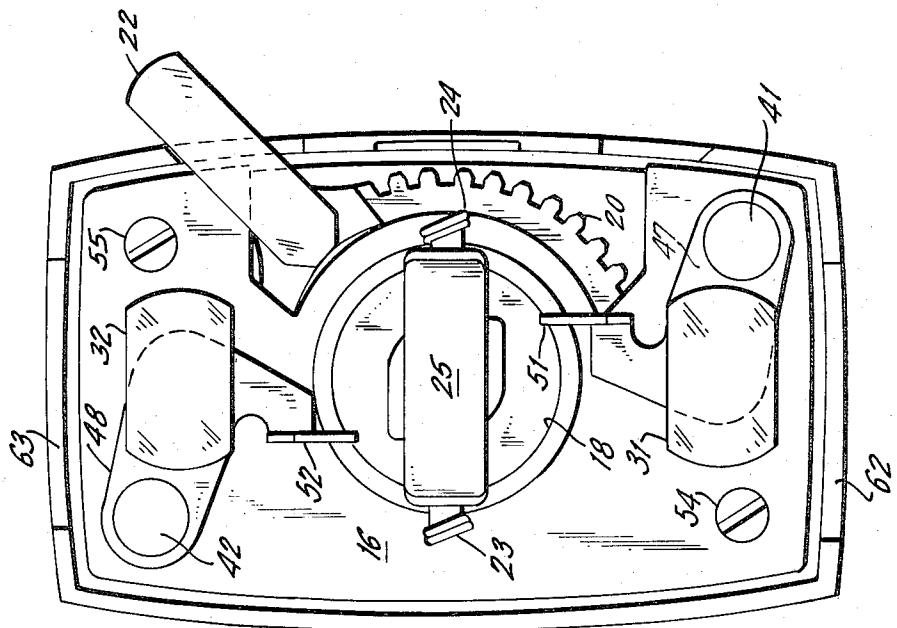
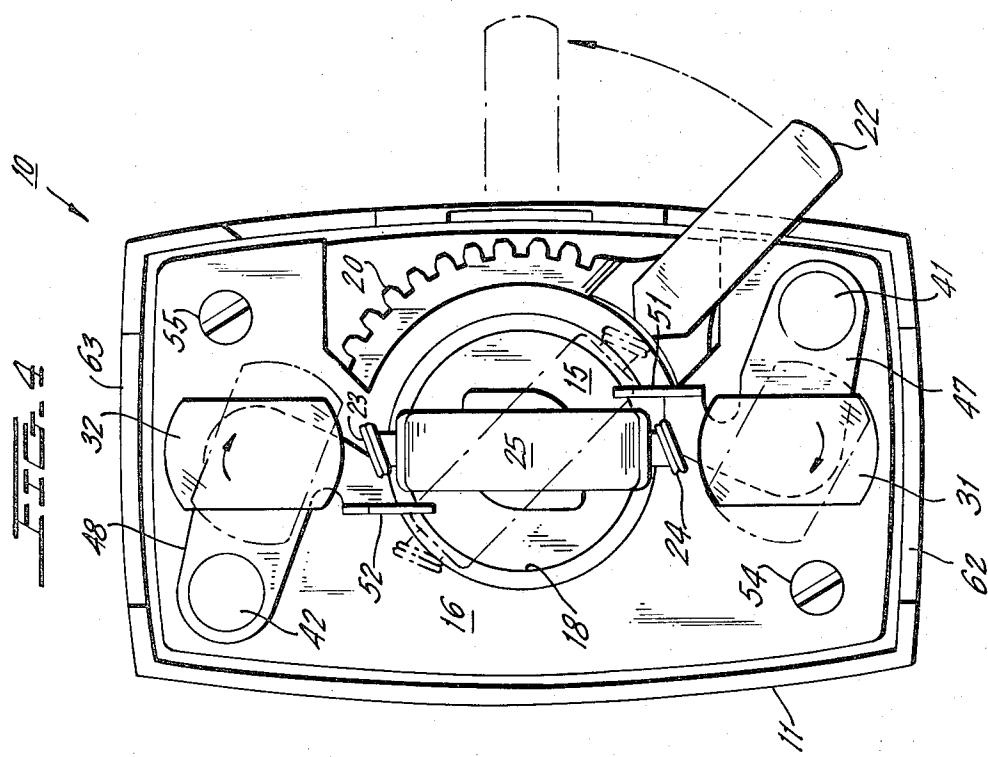


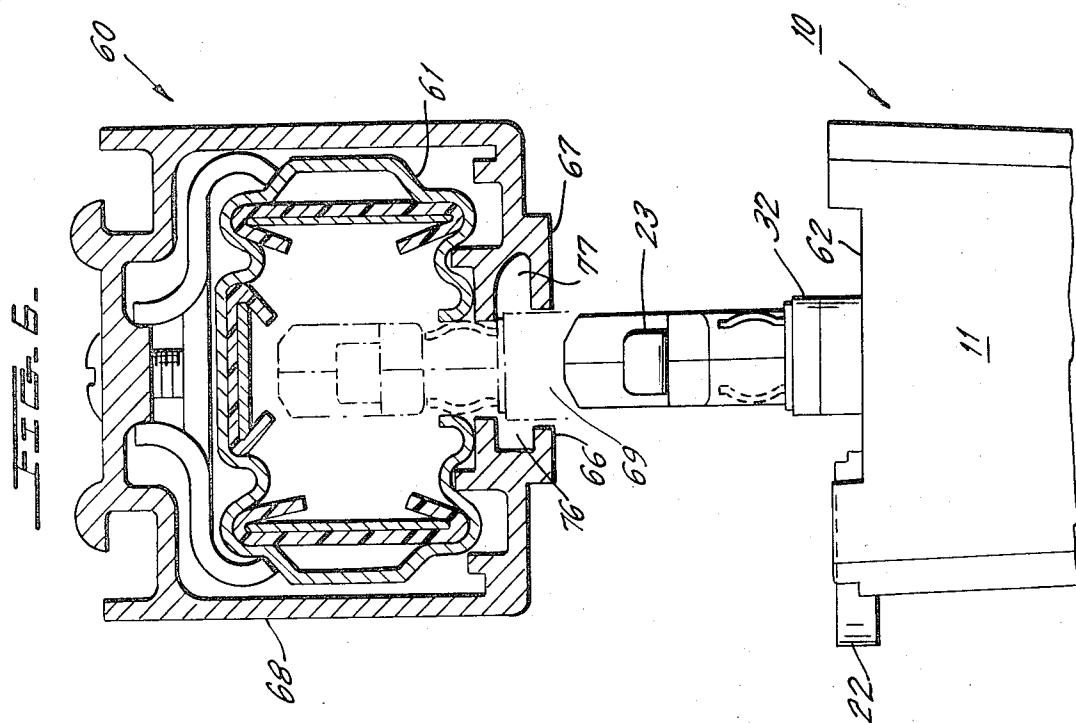
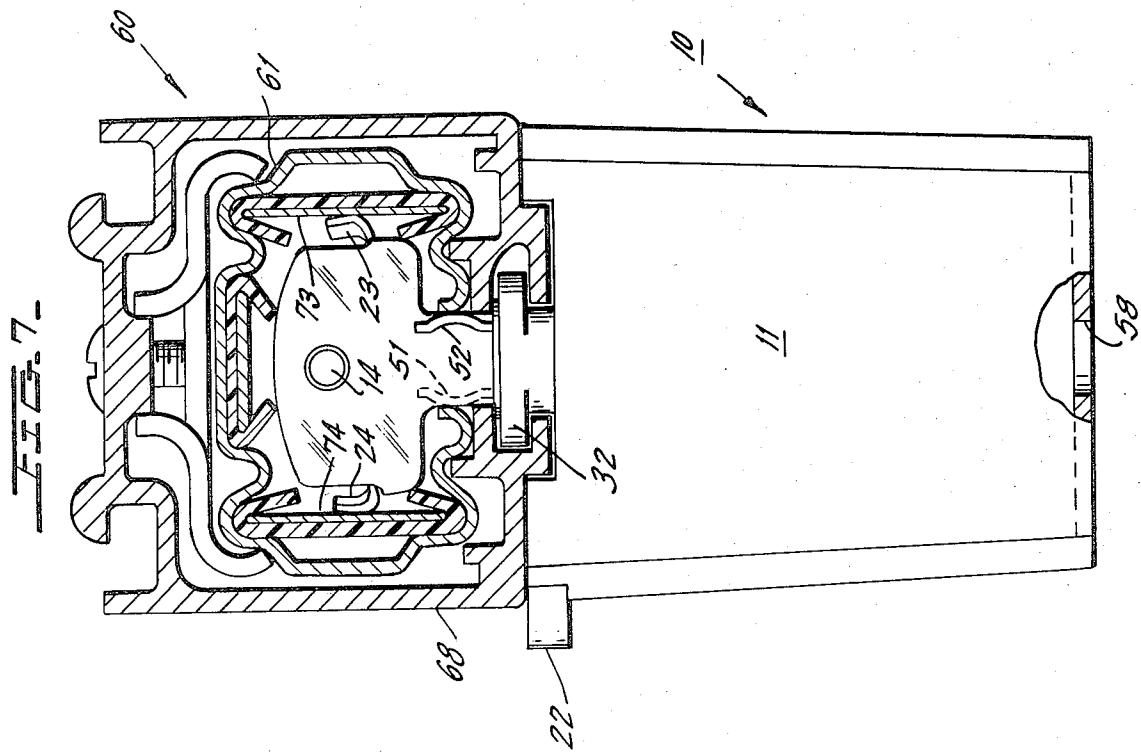
FIG. 4



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POWER TAP FOR CONTINUOUS OUTLET DUCT

For many years continuous outlet electrified duct was constructed with a formed sheet metal housing which proved satisfactory from both an electrical and mechanical viewpoint. However, relatively recently this type of housing fell into disfavor because of appearance considerations.

In order to provide a more pleasing duct appearance, many continuous outlet ducts are now constructed with extruded housings. In my copending application Ser. No. 308,975 filed Nov. 24, 1972, for an ELECTRIFIED DUCT AND FITTINGS THEREFOR, a stylized extruded housing encloses standard continuous outlet duct constructed with a formed sheet metal casing. Since great effort has been expended in producing stylized duct, the power tapping devices used therewith should also be stylized, while maintaining electrical and mechanical features of prior art devices for tapping power from ducts having formed sheet metal housings.

Thus, this invention provides a power tapping device in which gear elements mechanically interconnect a contact carrier and two mechanical securing elements in a manner such that manipulation of a single lever subsequent to locating the power tap on the duct housing makes the electrical connections and mechanically secures the power tap to the duct. Locating the power tap on the duct housings automatically brings grounding fingers of the power tap into wiping engagement with the formed sheet metal inner housing. The power tap is provided with a housing having polarizing formations complementary to polarizing formations of the stylized duct housing, with these polarizing formations cooperating with each other to insure that proper electrical connections are made.

Accordingly, a primary object of the instant invention is to provide a novel construction for a power tapping device used with a continuous outlet duct having an extruded housing.

Another object is to provide a power tapping device of this type in which mechanical and electrical connections are made by the manipulation of a single lever.

Still another object is to provide a power tapping device of this type that cannot accidentally be connected improperly to the duct.

A further object is to provide a power tapping device of this type having means to insure a positive ground connection with the duct.

A still further object is to provide a power tapping device of this type capable of being utilized with many different types of lamp fixtures and other utilization devices.

These objects as well as other objects of this invention will become readily apparent after reading the following description of the accompanying drawings in which:

FIG. 1 is an exploded perspective of a power tapping device constructed in accordance with teachings of the instant invention.

FIG. 2 is a side elevation of the power tapping device of FIG. 1, with portions of the housing broken away to reveal internal operating elements.

FIG. 3 is an end view, looking in the direction of arrows 3-3 of FIG. 2, with the near wall of the device housing broken away.

FIGS. 4 and 5 are plan views of the power tapping device. In FIG. 4 the elements are shown in the inserting or mounting position, and in FIG. 5 these elements are shown in the operating position.

FIGS. 6 and 7 are end views of the power tapping device showing its relation to a continuous outlet stylized duct. In FIG. 6 the device is in its inserting or mounting position, and in FIG. 7 the device is shown mounted to the duct, with the electrical and securing elements in their operating positions.

Now referring to the Figures. Power tapping device 10 includes generally rectangular die cast housing 11 that is open at its upper end to receive a subassembly consisting of the remaining elements of device 10. This subassembly includes molded insulating contact carrier 12 constructed of mating halves secured together by rivets 13, 14. Cylindrical main portion 15 of carrier 12 is sandwiched between parallel metal mounting plates 16, 17 having aligned circular apertures 18, 19, respectively, that provide journals for guiding pivotal movement of contact carrier 12. Drive gear 20 is mounted to carrier 12 just below upper mounting plate 16 and is keyed to contact carrier 12 by inwardly extending ear 21 (FIG. 1), so that pivoting of main gear 20 by utilizing its integrally formed radial extension 22 is effective to pivot the entire contact carrier 12.

Contacts 23, 24, mounted at opposite ends of contact carrier nose portion 25, are connected to the respective flexible insulated leads 26, 27 that extend downward through carrier 12 and into the area of housing 11 below lower mounting plate 17. For a reason that will become obvious, nose portion 25 is relatively narrow, extends above upper mounting plate 16 and is disposed outside of housing 11.

Plate-like elongated retainers 31, 32 are disposed slightly above upper plate 16 in a plane parallel thereto and are provided with respective integrally formed downwardly extending shafts 33, 34 whose lower ends extend into the respective apertures 35, 36 in lower mounting plate 17. Spur gears 37, 38, both in mesh with main gear 20, are keyed to the respective shafts 33, 34 and are positioned adjacent the bottom surface of upper mounting plate 16.

Rivet pins 41, 42, extending through the respective apertures 43, 44 in upper mounting plate 16 and respective apertures 45, 46 in lower mounting plate 17, secure mounting plates 16, 17 together. Grounding elements 47, 48 are captured against the upper surface of upper mounting plate 16 by the enlarged heads of the respective pins 41, 42 and the cylindrical downward extensions of the respective mechanical retainers 31, 32. Grounding members 47, 48 are constructed of conductive spring material and are provided with upwardly extending deflectable grounding fingers 51, 52, respectively, that firmly engage formed sheet metal casing 61 (FIGS. 6 and 7) of stylized continuous outlet duct 60 when power tap 10 is mounted thereto. Screw 59, threadably mounted to lower plate 17, is provided for the making of a ground connection from a utilization fixture, such as a lamp (not shown) to power tap 10. Circular aperture 58 in the bottom wall of housing 11 is provided for mechanical securement of such utilization device to power tap 10 by receiving a nipple (not shown) or other extension of the utilization device.

Upper plate 16 rests against the upper ends of posts 56, 57 inside of housing 11 at diagonally opposite corners thereof. Screws 54, 55 extend through the respec-

tive clearance apertures 64, 65 in upper mounting plate 16 and are received by threaded apertures in the respective posts 56, 57. The end walls of housing 11 at the upper edges thereof are provided with notches 62, 63, that receive polarizing lips 66, 67 (FIG. 6) at the bottom of extruded stylized housing 68 of duct 60 along opposite edges of its longitudinally extending access slot 69.

In order to mount power tap 10 to continuous outlet duct 60, lever 22 is moved to its position of FIG. 4. This operates gears 20, 37, and 38 so that when viewed from above, contact carrier nose 25 and securing elements 31, 32 are positioned with their longitudinal axes extending parallel to the longitudinal axis of housing 11. This permits nose 25 to move into access slot 69 of duct 60 and permits retainers 31, 32 to move above lips 66, 67 into alignment with recesses 76, 77 positioned immediately above the respective lips 66, 67. At this time polarizing notches 62, 63 of housing 11 receive polarizing lips 66, 67. It is noted that in its inserting position of FIG. 4, the longitudinal axis of nose 25 is offset from a line extending between the midpoints of notches 62, 63 so that power tapping device 10 may not be rotated 180° from its mounted position of FIG. 7.

After the upper end of housing 11 is seated against the lower surface of housing 68, lever 22 is moved counterclockwise with respect to FIG. 4 to the operating position of FIG. 5. This motion operates gear elements 20, 37, 38, so that contact carrier nose portion 25 is brought to its operating position wherein power tap contacts 23, 24 are in engagement with bus bars 73, 74, respectively, of duct 60. At the same time, securing elements 31, 32 are pivoted to their holding positions wherein the longitudinal axis of element 31, 32 are transverse to the longitudinal axis of duct 60, and the ends of elements 31, 32 are captured within retaining slots 76, 77 to mechanically secure power tap 10 to duct 60. As nose portion 25 of contact carrier 12 is inserted into access opening 69, the deflectable arms 51, 52 of grounding contact members 47, 48 rub against the portion of duct casing 61 bounding access slot 69 and coming to rest in firm engagement with casing 61 so as to provide a positive ground connection between bus 60 and power tap 10.

Although there have been described preferred embodiments of this novel invention, many variations and modifications will now be apparent to those skilled in the art. Therefore, this invention is to be limited not by the specific disclosure herein but only by the appending claims.

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

1. A device for tapping power from a continuous outlet duct having a housing with a longitudinal access slot and enclosing a plurality of longitudinally extending bus bars; said device including a plurality of contacts engageable with duct bus bars, carrier means having a nose portion to which said contacts are mounted, with said nose portion being insertable into a duct housing through its access slot, support means to which said carrier means is pivotally mounted, mechanical securing means mounted to said support means remote from said carrier means and engageable with securing formations of a duct housing located adjacent its access slot, and first means interconnecting said carrier means and said securing means whereby pivoting of said carrier

means from an inserting position to an operating position operates said securing means from a mounting position to a holding position.

2. A device as set forth in claim 1 also including deflectable grounding contact means mounted to said support means and engageable with a duct housing in the vicinity of its longitudinal access slot.

3. A device for tapping power from a continuous outlet duct having a housing with a longitudinal access slot and enclosing a plurality of longitudinally extending bus bars; said device including a plurality of contacts engageable with duct bus bars, carrier means having a nose portion to which said contacts are mounted, with said nose portion being insertable into a duct housing 15 through its access slot, support means to which said carrier means is pivotally mounted, mechanical securing means mounted to said support means and engageable with securing formations of a duct housing located adjacent its access slot, and first means interconnecting 20 said carrier means and said securing means whereby pivoting of said carrier means from an inserting position to an operating position operates said securing means from a mounting position to a holding position, said first means including interengaged gear elements.

4. A device as set forth in claim 3 in which the mechanical securing means includes spaced first and second sections, said carrier means having a portion extending between said sections.

5. A device as set forth in claim 4 in which a first and a second of said gear elements are keyed to the respective first and second sections, a third of said gear elements being keyed to said carrier means and being in driving engagement with the first and second gear elements.

6. A device as set forth in claim 5 in which there is a radial extension projecting from said carrier means for manually supplying power to operate said gear elements.

7. A device as set forth in claim 6 in which there is an individual deflectable grounding element adjacent to each of said first and second sections.

8. A device as set forth in claim 7 in which said gear elements are mounted on parallel axes and free portions of said grounding elements extend generally in the direction of said axes.

9. A device as set forth in claim 5 in which the support means includes first and second spaced parallel plates, said gear elements positioned between said 50 plates and to the rear of said first plate; said nose portion, said sections and a grounding means extend forward of said first plate; said gear elements being mounted to axes perpendicular to said plates.

10. A device as set forth in claim 5 in which the gear elements are mounted to parallel axes; said first and second sections including respective first and second holding portions that are elongated and relatively thin; said axes for said first and second gear elements being at right angles to the respective first and second holding portions.

11. A device as set forth in claim 3 in which there is a housing wherein said gear elements are disposed, said housing including polarizing formations on opposite sides of the nose portion; with said carrier means in said 65 inserting positions said nose portion being non-symmetrical with respect to said polarizing formations.

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