United States Patent

Johnson

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[45] **July 25, 1972**

[54] ELECTRICAL OUTLET TROLLEY

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[52] **U.S. Cl.**.....**339/2 R,** 339/21 S, 339/135, 191/23 A, 191/45

[51] **Int. Cl.**.....**H01r 41/00**

[58] **Field of Search**.....191/23 A, 45; 339/2, 22, 135, 339/21, 9

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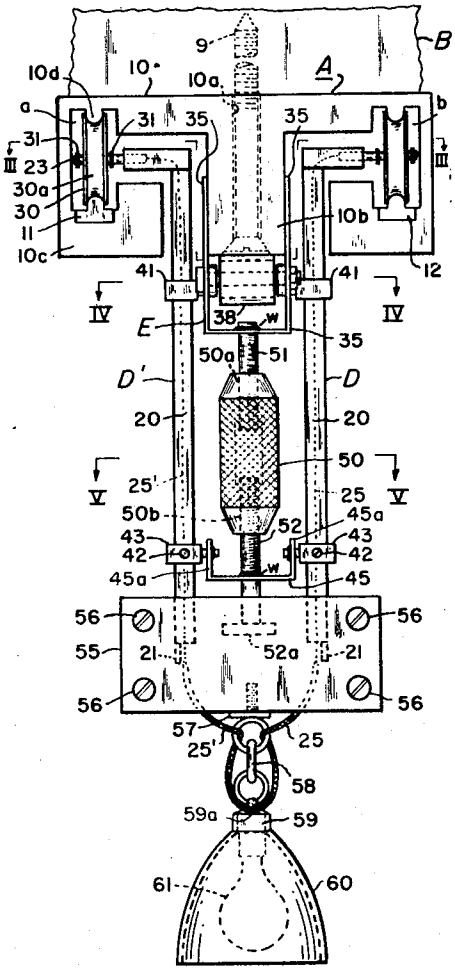
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[57] **ABSTRACT**

An overhead electrical outlet is suspended from a trolley frame structure that is provided with opposite pairs of side-mounted, closely coupled trolley wheels. A fixedly mounting head or box carries a pair of conductor bars of opposite electrical polarity that serve as guide tracks and electric current supplying rails for opposite pairs of trolley wheels. The frame structure has means cooperating with centrally disposed guide rollers and the head or box to regulate or adjust engagement pressure force applied by the trolley wheels to the associated current supplying rails. The construction enables the outlet to be easily moved longitudinally in line or in a circular or curved path from one position to another.

17 Claims, 10 Drawing Figures



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SHEET 1 OF 3

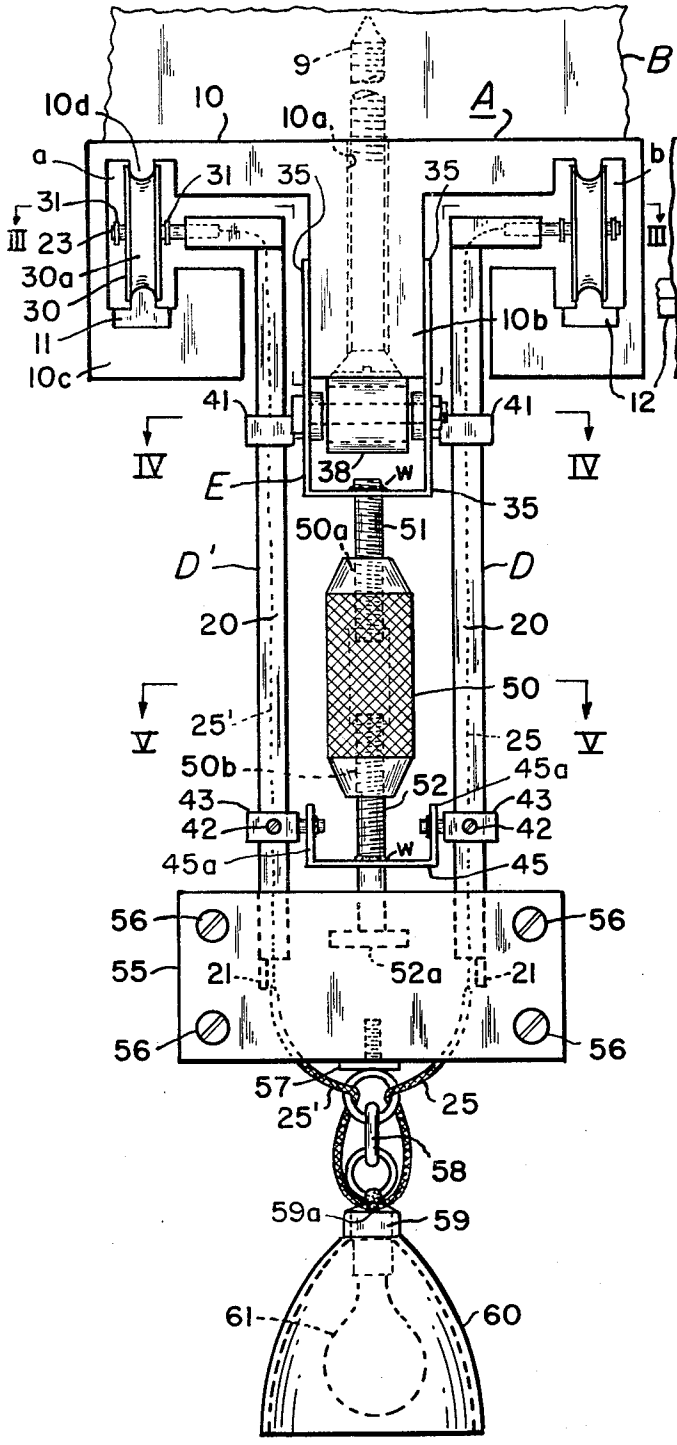


Fig. 1

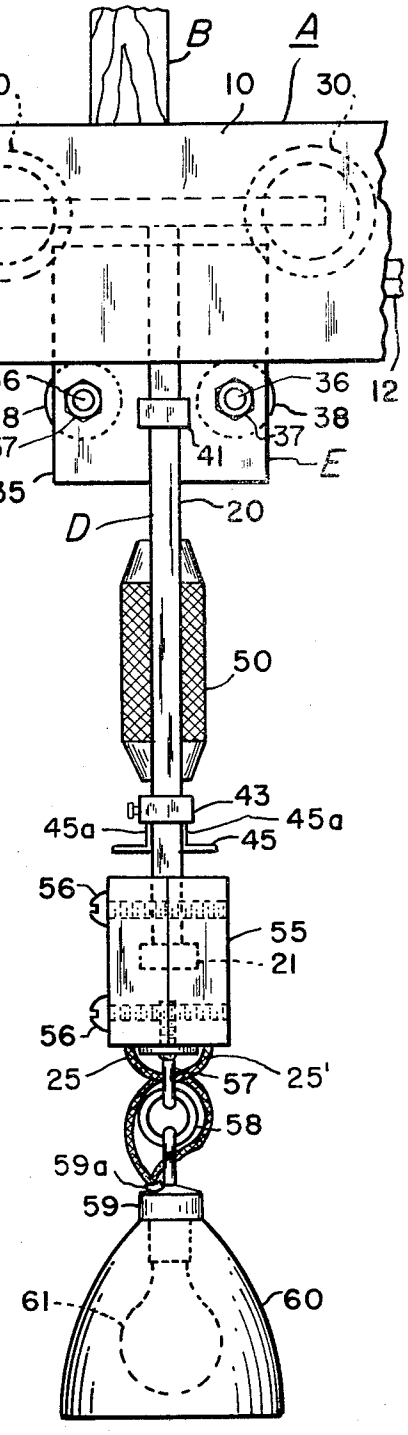


Fig. 2

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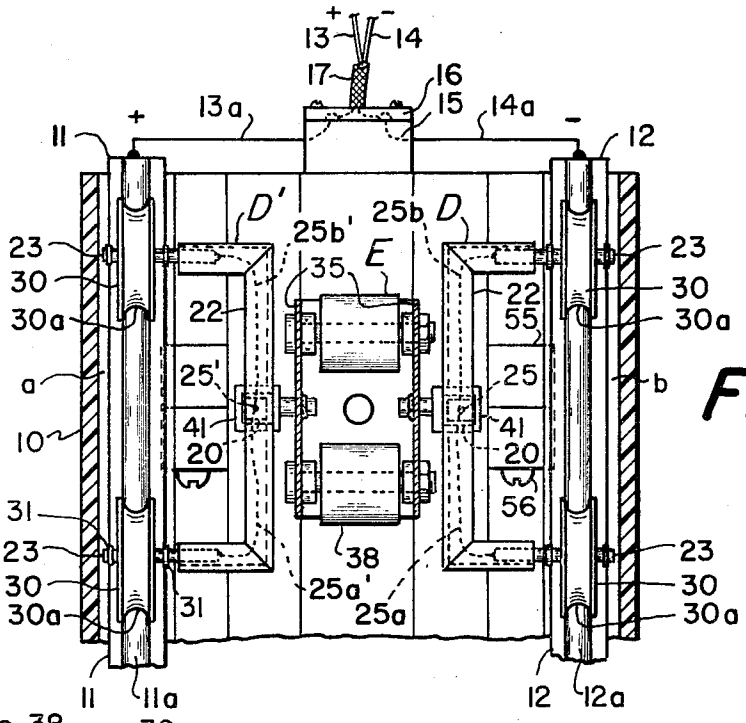


Fig. 3

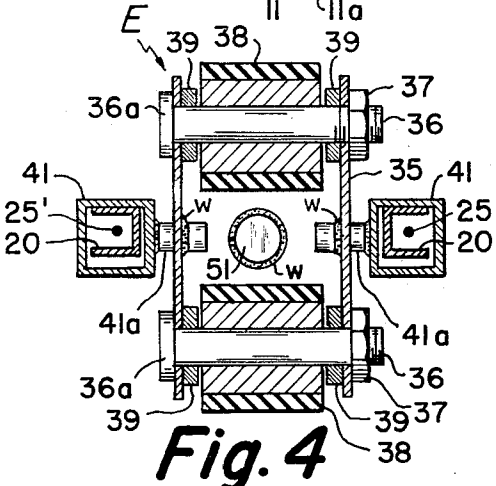


Fig. 4

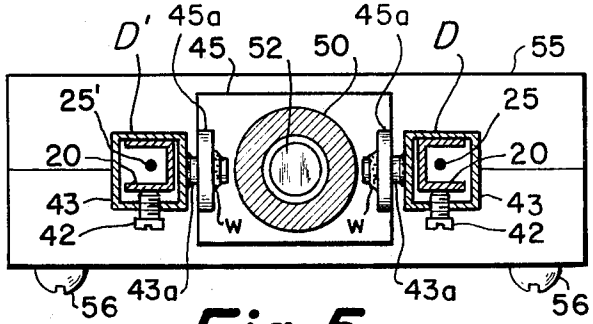


Fig. 5

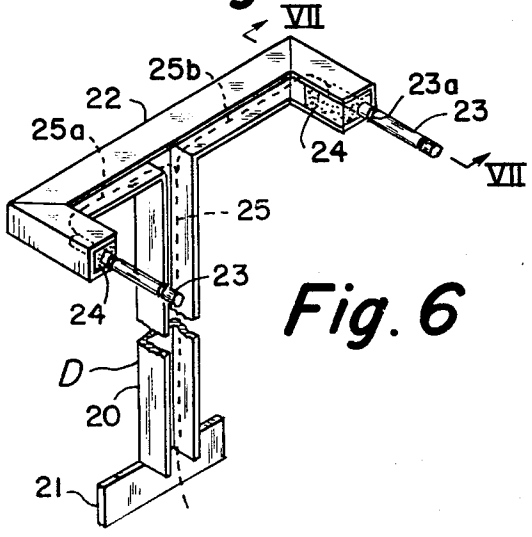


Fig. 6

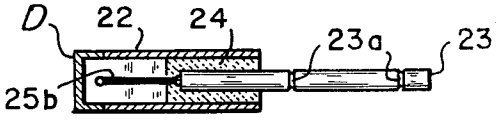


Fig. 7

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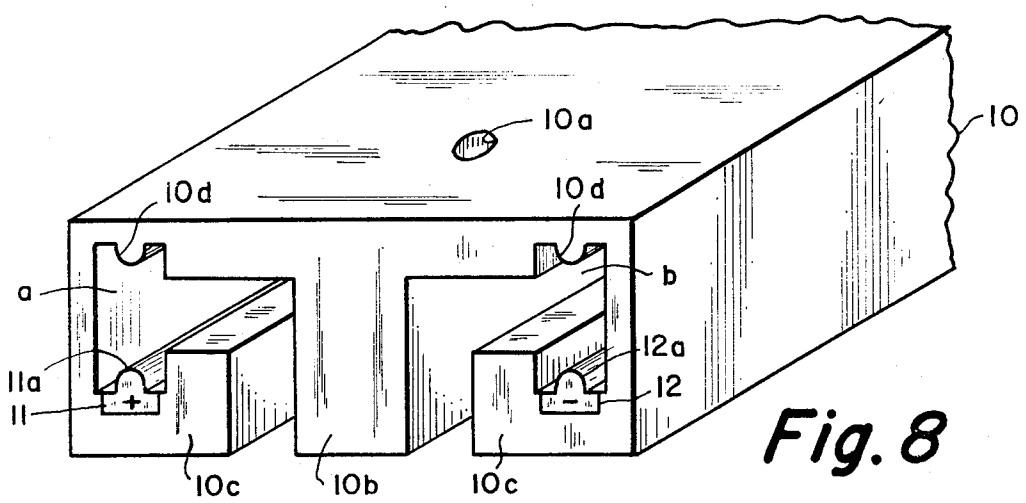


Fig. 8

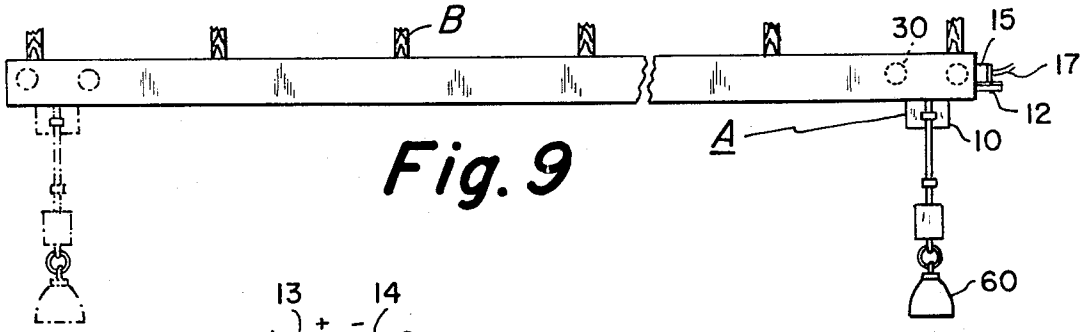


Fig. 9

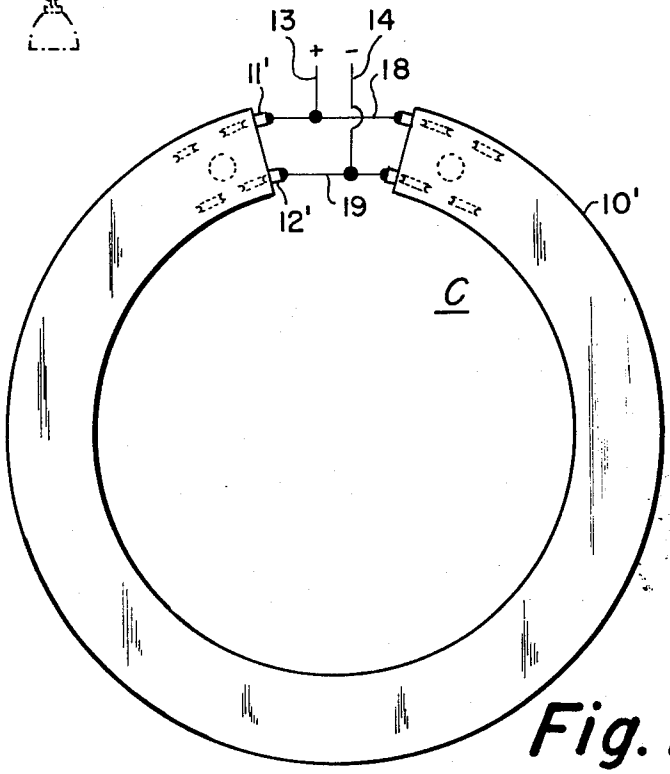


Fig. 10

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ELECTRICAL OUTLET TROLLEY

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an improved form of overhead electrical outlet construction and particularly, to a compact, safe, practical and easily position-changed electrical outlet for an overhead lighting system or the like.

2. Description of the Prior Art

There has been a need for a flexible, safe and easily adjustable and foolproof overhead electrical outlet construction that may have one or more electrical outlet sockets which can be easily and quickly adjusted as to their positioning along the room. Such a construction is needed for concentrating light rays on a work bench, a lathe, a picture, a room panel, etc. So far as known, previous to my work in this connection, there has been only one type of commercially produced outlet for so-called flexible accent lighting. This form employs an overhead enclosure with clip-in outlet units that are adapted to be locked-in position, removed and reinserted in different positions along the fixed-position overhead enclosure. There have been various patents taken out in this general field, but constructions represented have been too complex for practical utilization, others provide poor electrical contacts between fixed and movable parts, others have been of a type that are not electrically safe from the standpoint of a possible short-circuit or from the standpoint of delivering an electric shock to an operator. The above-mentioned commercial type has the disadvantage that its units have to be unlocked and turned, manually lifted out of place, inserted in a new position, turned and locked for changing outlet positions.

The present structure was developed as a result of the need for a flexible and electrically efficient type of outlet mounting of practical and safe construction that may be used in the living rooms of a home as well as in a work shop by photographers, printers and handymen. It does not require any expertise in electrical circuits, and makes use of a very simple track rolling movement to change the position of an outlet from one location to another. In addition to providing a construction that will be safe and foolproof from the standpoint of any danger arising from the use of electrical current, it has been necessary to provide a construction that will assure a maximum efficiency of electrical current carrying capability to eliminate any sparking, minimize resistance losses, burning of contacts, etc.

SUMMARY OF THE INVENTION

It has thus been an object of the invention to provide a practical solution to the problem of providing one or more electrical outlets that can, as a practical matter, be trolley-operated for flexible and ready position changing and, in such a manner, as to assure an efficient flow of electrical current through the construction to an electric light or other electrically operated element or device.

Another object of the invention has been to provide a flexible and relatively simple overhead electrical outlet construction that will be effectively trolley-operated, and that can be adjustably controlled as to the pressure force exerted between movable, electrical-current-carrying parts thereof.

A further object of the invention has been to devise a flexible electrical outlet construction that will be adapted for curvilinear as well as in-line position adjusting movement with respect to an overhead portion of a room.

A still further object of the invention has been to develop a compact, efficient and relatively simple and practical position-adjustable overhead electrical outlet that may be mounted on the ceiling or adjacent wall portion of a dwelling or shop.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings,

FIG. 1 is an end view in elevation of an electrical outlet apparatus constructed and utilized in accordance with the invention.

FIG. 2 is a fragmental side view in elevation on the same scale as and of the construction of FIG. 1.

FIG. 3 is a fragmental top plan view on the scale of and of the construction of FIG. 1, taken with the upper portion of an enclosing box or head part being removed to particularly illustrate inner and under-working parts of the construction; this view is taken along the line III—III of FIG. 1.

FIG. 4 is a horizontal section taken along the line IV—IV of FIG. 1 and on an enlarged scale with respect thereto.

FIG. 5 is a section on the scale of FIG. 4 taken along the line V—V of FIG. 1.

FIG. 6 is a fragmental perspective view in elevation illustrating the construction of a side-positioned mounting bracket or frame for each pair of trolley wheels that is employed to conduct electric current from an associated conductor bar rail to an outlet socket or the like; this figure is on the same scale as FIGS. 1, 2 and 3.

FIG. 7 is an enlarged fragmental section taken along the line VII—VII of FIG. 6 and particularly illustrating the mounting of a conductor stub shaft that carries a pulley wheel.

FIG. 8 is a front perspective fragment on the scale of FIGS. 1 to 3, and particularly illustrating a box or head that is to be fixedly mounted in an overhead position on the wall of a room.

FIG. 9 is a greatly reduced side view in elevation, particularly illustrating the mounting of the overhead box or head and two extreme positions of an outlet with respect thereto; and

FIG. 10 is a top plan view on a reduced scale showing a modified or curvilinear overhead box or head part that may be utilized with the same movable assembly as the straight line extending box or head, such as illustrated in FIG. 9.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In carrying out the invention, an overhead unit, construction or apparatus A is shown in an operatively assembled and utilized relationship in FIGS. 1 and 2. Unit A has an elongated or longitudinally extending overhead box or head part **10** that is adapted to be semi-permanently fixed or secured, as by heavy wood mounting screws **9**, to ceiling joists B or an adjacent side wall portion of a room. The screws **9** may be provided at suitable spaced-apart locations to extend through holes **10***a* (see also FIG. 8) in the box or head part **10**. The box **10** may be of a length representing a desired field or extent of flexible adjustment that is to be accomplished from the standpoint of an electrical outlet. One or more traveling outlet suspension carriages or wheeled assemblies D, D′ may be inserted endwise within an end of a mounted box or head **10** for position-adjustable movement therealong. In this connection, the carriage has a pair of vertically upwardly extending, vertically T-shaped and horizontally U-shaped side-positioned frames D and D′ of the same general construction (FIG. 6) that are mounted in a suspended relation within a pair of spaced-apart or open bottom recessed portions *a* and *b* (see FIG. 8) on each side of an inner, centrally downwardly extending abutment or shoulder portion **10***b*. The recessed portions are defined by a pair of side-positioned and extending, recessed rail mounting ledge portions **10***c* of the box **10**. As illustrated particularly in FIGS. **1**, **3** and **8**, a pair of conductor or bus bars, track or rail members **11** and **12** of opposite potential are at their ends connected by wire leads **13***a* and **14***a* to electric wires such as **13**, **14** of an electrical cable **17**, representing a source of supply, through the agency of a connector box assembly **15**, **16**. The cable **17** may be introduced directly into a removable head portion **16** of the connector box assembly.

Each movable side frame D, D′ may be of channel-shape, such as shown in FIGS. **4**, **5**, **6** and **7**; the ends of its horizontal arm portion carry a pair of stub shafts **23** of relatively hard conductor metal, such as of copper or aluminum alloy. Each stub shaft **23** is adapted to extend from an end of one of the branches or fingers of the upper U-shaped portion **22** by means of an insulating resin or rubberlike plug **24** that is set within the open end portion thereof. Branch insulated wire

leads 25*a* and 25*b* are soldered or brazed to the inner or mounted ends of each shaft 23 and are together joined to a vertically extending insulated wire 25 or 25' to extend along a vertical leg portion 20 of each frame D or D' and downwardly through a lower supporting head part or assembly 55 to enter a suitable socket 59, see FIGS. 1 and 2. An electrically conductive guide wheel 30 is rotatably mounted on each of the shafts 23 by suitable means, such as snap rings that fit within circular grooves 23*a*. Each frame D and D' thus has a pair of closely coupled or adjacent wheels 30 that have a balanced, spaced relation with respect to each other, endwise of the associated suspension frame D or D'. The side-positioned pairs of conductor wheels 30 have a balanced relation with respect to each other transversely of the mobile frame structure made up by side frames D and D' and a centrally positioned pendant tension adjusting or engagement control frame E.

The centrally positioned pendant tension adjusting or force application control frame E is adapted, as particularly illustrated in FIGS. 1, 2, 4 and 5, to be vertically adjustably mounted with respect to the pair of wheel-carrying side frames D and D', and to cooperate in a slidable relation with a lower face of central shoulder or abutment portion 10*b* of the box or head part 10. The control frame E has upwardly open, U-shaped frame part 35 whose opposite leg portions are adapted to slidably fit in a close guided relation along opposite vertical sides of the abutment or shoulder 10*b*. A pair of guide and pressure-applying, relatively smooth-surfaced rollers 38, shown in FIG. 4 as having a metal core or body encircled by a resin or hard rubber sleeve, is rotatably carried on a pair of associated pin or bolt shafts 36. The pin shafts 36 extend across between the legs of the frame part 35 adjacent its lower end. Each short length shaft 36 is securely mounted in position by means of its head 36*a* and a nut on its extending threaded end. Spacer washers 39 maintain each roller 38 in a relatively free, guided, rotating positioning on the associated shaft 36.

The frame structure E is adapted to be preliminarily set at a vertical position along the side frames D and D' at which the rollers 38 somewhat loosely engage the bottom face of the shoulder 10*b*. This is accomplished by set screws 42 carried by a pair of lower slide sleeves or collars 43 of closed boxlike section (see FIG. 5). It will be noted that the inner space along channel-shaped leg 20 of each side frame D and D' serves as an enclosure for passing an associated, insulated electrical wire lead 25 or 25' downwardly therealong as well as a mounting means for the frame E through the agency of upper and lower pairs of sleeves or collars 41 and 43. The pair of upper side sleeves or collars 41 are slidably adjustably mounted on the legs 20 for vertical movement therealong as controlled by an adjustment turnbuckle or nut element 50.

It will be noted that the sleeves 41 are secured on pin shafts 41*a* by weld metal *w* to extend from opposite side legs of the frame part 35. In a like manner, sleeves 43 are secured on pin shafts 43*a* by weld metal *w*. It will be noted that the upper pair of sleeves 41 are always slidably positioned on the respective legs 20 of the side frame D and D', while the lower pair of sleeves 43 are secured in a fixed relation. This enables adjustment of the upper frame E vertically upwardly and downwardly with respect to the abutment 10*b* by turning the turnbuckle or knurled adjustment part or nut element 50. The lower pair of sleeves 43 are carried by the pair of associated mounting pins 43*a* to extend from an upwardly projecting pair of lugs or ears 45*a* of a bottom-positioned U-frame part or member 45 by weld metal *w*.

Again referring to FIGS. 1 and 2, lower, two-part outlet supporting block 55 is adapted to receive and position a cross-extending mounting foot portion 21 on the lower end of the leg 20 of each side frame D and D', as well as a rounded flange 52*a* on the lower end of a lower threaded shaft or stem 52 that extends through the lower frame part of member 45 and is secured thereto by weld metal *w*. An upper threaded screw or stem 51 is secured as by weld metal *w* at its upper end to extend centrally downwardly through the frame part or member 35. Knurled adjustment nut or turnbuckle 50 has a pair of upper and lower, vertically aligned threaded bore portions 50*a* and 50*b* at its opposite ends which adjustably receive the stems 51 and 52.

For adjustment purposes, the stems 51 and 52 will have a different type of direction of threading. That is, the stem 51 may have a righthand thread and the stem 52 will then have a lefthand thread. Thus, manually turning the turnbuckle 50 counterclockwise will cause the frame part 35 and its associated rollers 38 to be moved downwardly in a direction away from the face of the abutment 10*b*, while opposite or clockwise movement will cause the rollers 38 to tightly engage the bottom face of the abutment 10*b* with increasing upward force to thus pull the frames D and D' downwardly and increase contact pressure between the wheels 30 and the rails 11 and 12. In this way, the force of electrical contacting engagement of the conductor wheels 30 and their respective recess or groove portions 30*a* with cooperating longitudinally extending, rounded rib or flange portions 11*a* or 12*a* of the track members 11 and 12 may be adjusted with reference to the tightness of pressure application therebetween. This also has the effect of adjusting the tightness of engagement of each wheel 30 with respect to the support shaft 23 on which it rotates and is carried. Thus, by reason of the nature of the mounting of the structures D, D' and E with respect to each other, an upward moving force exerted by the frame member 35 of the frame structure E through the agency of the rollers 38 will tend to move the wheels 30 downwardly with greater contacting force against the associated rail or bus bar track or rail member 11 or 12.

As shown particularly in FIGS. 1 and 8, the box or head part 10 has longitudinally extending, rounded, guide rib or flange projections 10*d* extending downwardly inwardly of its side recesses *a* and *b* to guidably fit within the peripheral groove or recess portion 30*a* of a pair of associated conductor wheels 30. The flange portions 10*d* are in a cooperating, vertically opposed relation with respect to the flanges 11*a* and 12*a* of the conductor bar track members 11 and 12.

By way of illustration, leads of opposite potential 25 and 25' are shown in FIG. 1 as extending downwardly through a bottom portion of the two part assembly 55, through an outlet-supporting, threaded eyelet pin 57, through cooperating chain linkage 58 and through a common opening in a pendant outlet or a socket-receiving mount 59 that may carry a light bulb 61 and a shade 60. The two parts of the construction 55 are shown secured together by machine screws 56 that cooperate with threaded bores that extend through the parts.

In FIG. 10, a modified type of head or box part 10' is shown which is of curvilinear or circular shape. In the unit or construction C of this figure, one or more of pendant assemblies may be used by inserting them endwise into the box part 10' at the end spacing between the opposite legs of its circular extent. Leads 13 and 14 from a source of electricity may be connected by auxiliary leads 18 and 19 to extending end portions of conductor bar or track members 11' and 12'. By reason of the connection of both ends of the track members 11' and 12' to the source of electric current, a highly efficient electrical conducting system is involved and can be, of course, obtained with the in-line type of installation represented by A of FIG. 9 by providing a pair of source cables, one for each end of the box 10. The circular arrangement of FIG. 10 is particularly suitable for use by photographers and artists, and is practical utilizing the closely coupled, positively moving and effective electrical contacting pendant units of the construction of the present invention.

An important aspect of the invention is the provision of means that is fully accessible and easily operated for adjusting the electrical contacting relationship between relatively movable conducting parts, namely, between the peripherally grooved wheels 30 and the flanged or ribbed bus bars 11 and 12. The arrangement is such that any required or desired tightness or non-sparking engagement may be attained between the moving parts to take care of heavier current loads, such as encountered with a very high wattage light bulb

and particularly, as encountered with various appliances, such as power tools used in a woodworking shop. In a situation where the load is heavy and the contact pressure or engagement is rather tight, the pressure may be relieved before moving the carriage from one position to another and then, at the other position, tightened-down to the desired extent. For minimal current carrying capacity, however, the nut **50** of the pendant adjusting or control frame E may be retained in its adjusted position, since the wheels **30** of the carriage cooperate with the rollers **38** to enable an efficient rolling movement from one position to another. The provision of side pairs of rollers in a closely spaced relation on the frames D and D' not only provide a fully balanced positioning of the carriage frame, but also enables the carriage frame to be used in a circular or curvilinear path of position-changing movement. The current carrying bus bars **11** and **12** are fully enclosed along their lengths in the overhead box part **10** to prevent short circuits and to protect persons from electrical shock. The adjustment means by reason of rollers **38** not only supplements the accurate positioning and movement effecting operation of the wheels **30**, but also serves to facilitate adjusting the electrical contact pressure between the relative moving parts.

The box **10** will preferably be of an insulating material, such as a resin or a fiberglass reinforced resin, and the supporting block **55** may be of a similar material or, if desired, of metal construction. The side frames D and D' and the control frame E will preferably be of metal construction. The conductor bus bars **11** and **12** may be secured in position within recesses in the ledge portions **10***c* in any suitable manner, as by cementing with an epoxy resin. It will be noted that the conductor wheels **30** will be operational even if the box **10** is mounted in a vertical position, for example, on the side wall of a room, since the bus bars **11** and **12** cooperate with the opposed flange portions **10***d* to retain the wheels in operative positions. If desired, the stub shafts **23**, the branch wire leads **25***a* and **25***b*, and the down lead wire **25** or **25'** may be provided by a metal conductor rod formed into a frame of the shape represented by the horizontal-U and the vertical-T shape of the associated side frame D or D'. In such an event, the rod-like conductor frame may be insulated by dipping it into a suitable insulating material in liquid form, such as rubber, resin, etc., or by a spray application. However, the mounting plugs **24** will preferably be used to give forwardly extending, bare axle portions of the conductor frame a secure mounting within the associated side frame D or D'.

I claim:

1. In an overhead electric outlet-suspending trolley construction adapted to be moved in a suspended operating relation from one position to another within a room, a fixed positioned overhead box part adapted to be secured to a ceiling or an adjacent wall portion of the room and having a pair of electrical current carrying bus bars extending in a concealed spaced-apart longitudinally extending relation therealong, a movable carriage part having wheels positioned for movement in electrical contacting relation along said bus bars, a pendant part carried by said carriage part and having an electrical outlet fitting, position adjusting mean operatively mounted between said carriage part and said box part for adjusting the force of electrical engaging contact between said wheels and said bus bars, and said carriage part having electrical connections from said wheels to said outlet fitting.

2. In a construction as defined in claim **1**, said position adjusting means having a slidable positioning at one end with respect to said carriage part.

3. In a construction as defined in claim **2**, said position adjusting means having a fixed mounting with respect to said carriage part at its other end, and having means for moving its said ends inwardly and outwardly with respect to each other.

4. In a construction as defined in claim **3**, roller means carried by said one end of said carriage part and engaging said box part for movement therealong.

5. In a construction as defined in claim **1**, said adjusting means having a lower end portion secured to said pendant part, having adjustable sleeve means securing its lower end portion to said carriage, having slide sleeve means mounting its upper end portion on said carriage, and having roller means carried by its upper end portion adapted to engage said box part for movement therealong.

6. In a construction as defined in claim **1**, said carriage part having a pair of spaced-apart wheels mounted on opposite sides thereof, each said pair of wheels being adapted for operative positioning on an associated said one of said bus bars for electrical engaging movement therealong in a balancing relation with respect to the other pair.

7. In a construction as defined in claim **1**, said box part having a central shoulder portion and a pair of transversely offset sidewise-positioned and longitudinally extending recessed portions therealong that are open downwardly along said central shoulder portion, said carriage having a pair of side legs extending upwardly along said shoulder portion into said recessed portions, said bus bars being positioned within said recessed portions to extend longitudinally therealong, and each of said side legs having an upper cross-extending arm carrying a pair of bus bar engaging wheels at opposite ends thereof.

8. In a construction as defined in claim **7**, said adjusting means comprising: an upwardly open U-shaped frame extending along opposite sides of said shoulder portion in a guided relation with respect thereto, roller means rotatably carried by and extending across a lower portion of said U-shaped frame to rotatably engage an underface of said shoulder portion for movement therealong, adjustment nut means operatively connected between said U-shaped frame and said pendant part for varying the vertical position of said roller means with respect to said shoulder portion to vary the force of electrical engagement between the wheels of said carriage part and their associated said bus bars.

9. In a construction as defined in claim **1**, said box part having a centrally located dependent shoulder portion extending longitudinally thereof and defining a planar underface therealong, a pair of side-positioned longitudinally extending recessed portions within said box part along and open downwardly from said shoulder portion, each of said bus bars being positioned on a bottom ledge of each of said recessed portions and having an upwardly projecting guide flange therealong, the upper wall of each of said recessed portions having a downwardly projecting guide flange therealong in vertical alignment with the guide flange of an associated bus bar positioned therewithin, and the wheels of said carriage having peripheral grooves for guided engagement between the flanges of said bus bars and of the upper walls of said recessed portions.

10. In a construction as defined in claim **9**, said carriage part having a pair of vertical legs extending upwardly through openings in said box part into an associated one of said recessed portions, a horizontal arm at the upper end of each of said legs extending horizontally forwardly and backwardly thereof within an associated recessed portion, and a pair of wheels carried at each end of each of said arms for riding movement along an associated one of said bus bars.

11. In a construction as defined in claim **10**, said adjusting means having a U-shaped upper frame guidably positioned for movement along said shoulder portion and having roller means engaging an underface of said shoulder portion, said adjusting means having a lower frame secured at its opposite ends on the pair of legs of said carriage, said upper frame having a pair of slide sleeves carried thereby and engaging an adjacent one of said legs for adjustable movement with respect thereto, a pair of right and left hand threaded stems, one of said stems being secured to project downwardly from said upper frame and the other of said stems being secured to project upwardly from said lower frame, and an adjustment nut having threaded bores at its opposite ends operatively mounted on said pair of threaded stems for adjusting the spacing between said upper and lower frames to thereby adjust the force of electrical contact engagement between said wheels and said bus bars.

12. In a construction as defined in claim 11, lower end portions of said pair of legs being secured within said pendant part, and a lower end of said lower threaded stem being mounted within said pendant part, and an electric outlet suspended from said pendant part.

13. In a construction as defined in claim 12, said pendant part comprising a pair of complementary fitted-together portions and having means removably securing said portions together about lower end portions of said legs and said lower stem.

14. In a construction as defined in claim 1, said box part being of a substantially straight-line longitudinal shape and having electrical leads connected to at least one end of said pair of bus bars.

15. In a construction as defined in claim 1, said box part being of circular shape and having means for securing it in a fixed position on the ceiling or adjacent wall portion of the room.

16. In a construction as defined in claim 15, said box part having a pair of separated end portions that are in a closely adjacent opposed relation with respect to each other, and common electrical connections to both ends of each of said bus bars at the separated end portions of said box part.

17. In a construction as defined in claim 1, said carriage having a pair of horizontally spaced-apart side frames, each said side frame having a pair of vertically downwardly extending side legs of hollow channel-like construction, each leg at its upper end having a U-shaped arm of hollow channel-like construction centrally connected thereto and extending transversely horizontally therefrom, a stub shaft mounted in each end of each of said U-shaped arms in an insulated relation with respect thereto, wire leads connected to each of said shafts and extending along the spacing within each said arm and leg downwardly into said pendant part, and electrical connections from the lower ends of said wire leads in said pendant part to said outlet fitting.

* * * * *