July 31, 1951 C. E. WOODSIDE ET AL 2,562,592

ELECTRIC OUTLET SOCKET AND PLUG

Filed Oct. 23, 1948 3 Sheets-Sheet 1

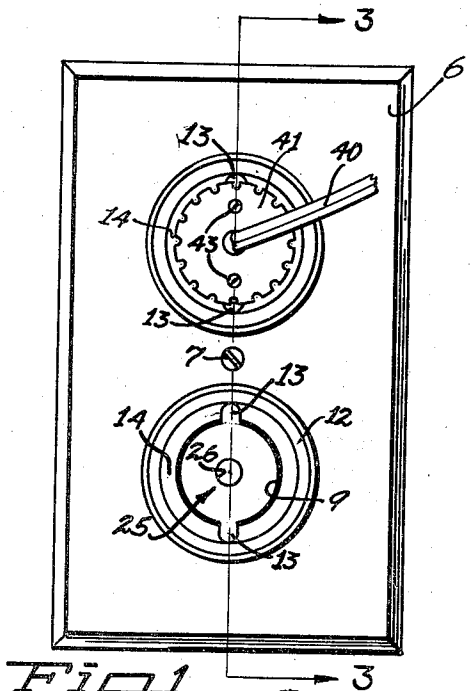


Fig. 1

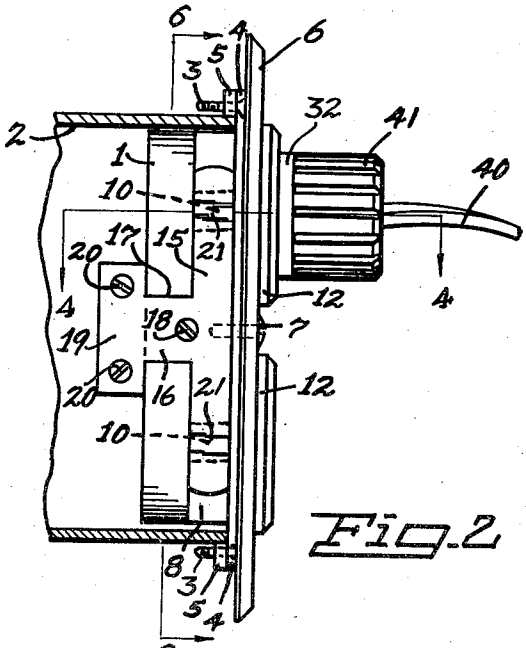


Fig. 2

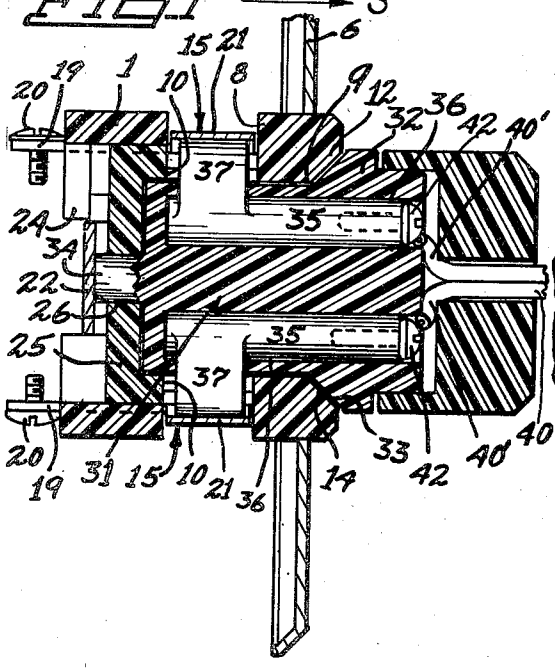


Fig. 4

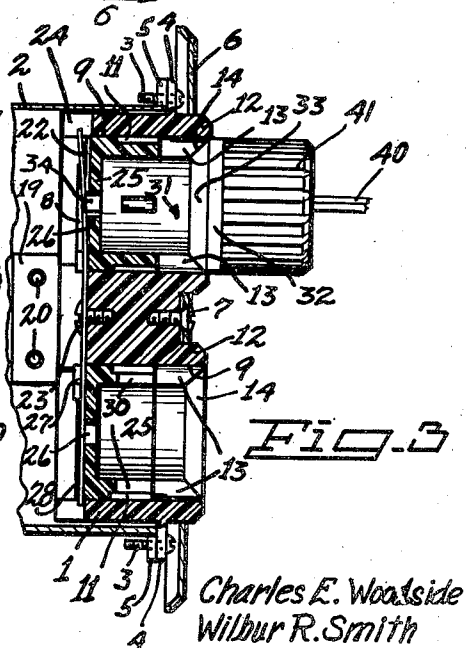


Fig. 3

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ELECTRIC OUTLET SOCKET AND PLUG

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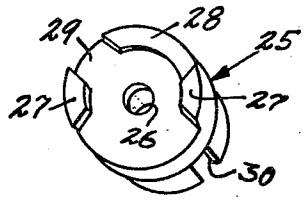


Fig. 5

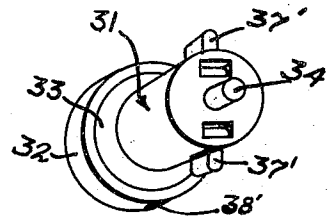


Fig. 7

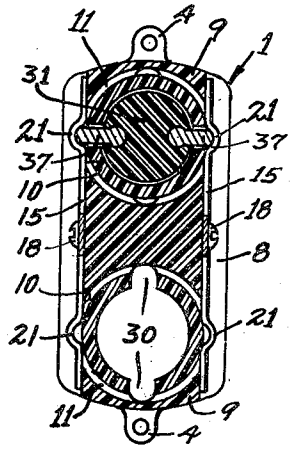


Fig. 6

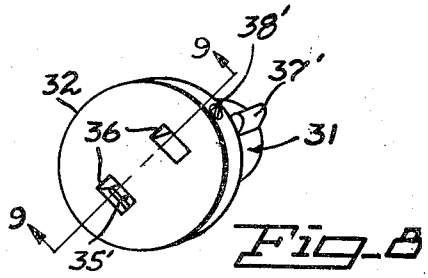


Fig. 8

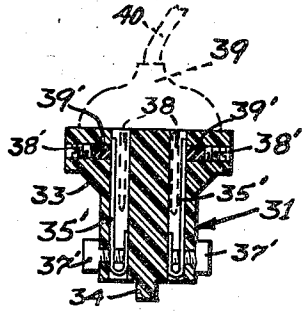


Fig. 9

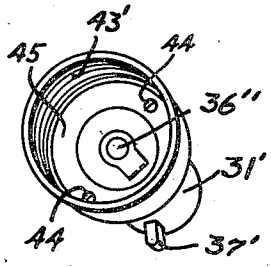


Fig. 10

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ELECTRIC OUTLET SOCKET AND PLUG

Filed Oct. 23, 1948 3 Sheets-Sheet 3

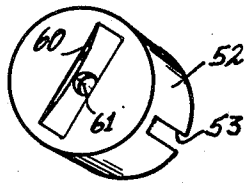


Fig. 13

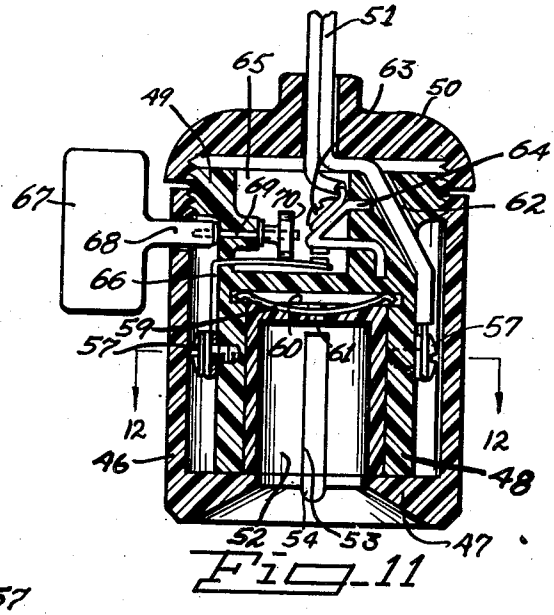


Fig. 11

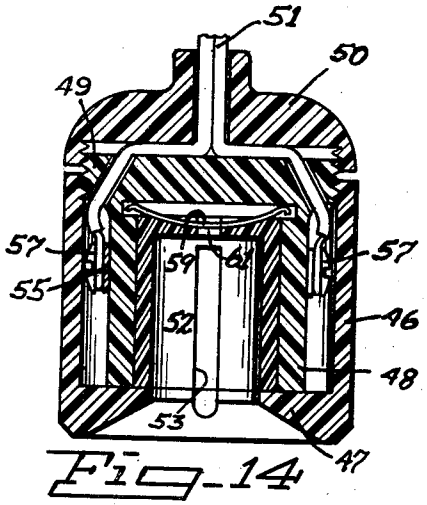


Fig. 14

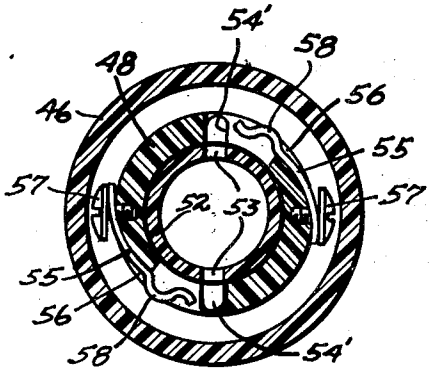


Fig. 12

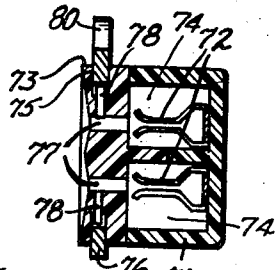


Fig. 16

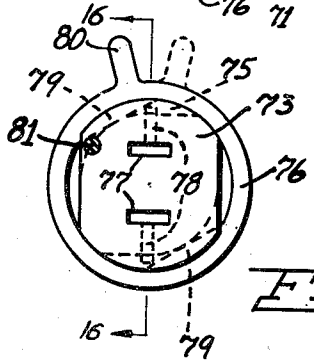


Fig. 15

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UNITED STATES PATENT OFFICE

2,562,592

ELECTRIC OUTLET SOCKET AND PLUG

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Application October 23, 1948, Serial No. 56,072

3 Claims. (Cl. 173—330)

1

This invention relates to an electric outlet socket and plug and one object of the invention is to provide an outlet and companion plug of such construction that a person will not be liable to receive an electric shock by accidently thrusting a finger into a socket or by careless handling of a plug.

Another object of the invention is to provide an electric outlet with a socket of such construction that a shell for receiving a terminal plug may be turned from a position for completing a circuit to a position in which the circuit is broken and thus allow the circuit to be broken when the plug is removed and danger of accidental closing of the circuit eliminated.

Another object of the invention is to provide a socket with a rotatable shell of such formation that when a companion plug is inserted a resilient latch serving to hold the shell in position opening a circuit will be moved to a releasing position and contacts of the plug move into engagement with contacts carried by the socket when the plug and the shell are turned to a position for closing the circuit, the contacts of the socket being resilient and serving to releasably hold the plug and the shell in the turned position.

An other object of the invention is to provide a device of this character wherein one embodiment of the invention is used as an outlet mounted in a wall of a building and another form in which it may be used as a drop light.

Another object of the invention is to provide a device of this character which is of simple construction and very efficient in operation.

The invention is illustrated in the accompanying drawings wherein:

Figure 1 is a face view of a wall outlet having a plug in one socket.

Fig. 2 is a side elevation of the outlet with the box in section.

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 2.

Fig. 5 is a perspective view of the protective sleeve which carries the locking mechanism.

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 2.

Fig. 7 is a perspective view of a plug looking at the end to be inserted.

Fig. 8 is a perspective view looking at the opposite end of the plug showing the adapter head for the present day plugs.

Fig. 9 is a sectional view taken along the line

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10—10 of Fig. 8 detailing the means for securing the pronged plug against removal.

Fig. 10 is a modified form of a plug having the conventional screw socket at its outer end to adapt the invention to the present day equipment.

Fig. 11 is a vertical cross section of a socket to be used with a drop cord.

Fig. 12 is a sectional view taken along line 12—12 of Fig. 11.

Fig. 13 is a perspective view of a sleeve and locking means, used in the socket shown in Figs. 11 and 12.

Fig. 14 is a modified drop cord socket without a switch.

Fig. 15 is a view of a device for securing a pronged plug in a conventional type wall outlet, and

Fig. 16 is a sectional view taken along the line 16—16 of Figure 15.

The improved outlet has been shown as a double outlet and has a body 1 formed from a block of insulation. This body fits into an outlet box 2 and is secured by screws 3 which pass through ears 4 projecting from the body and are threaded through the ears 5 of the box. After the body has been mounted in the box a face plate 6 is applied to conceal the box and the body is removably secured by a screw 7. Grooves 8 are formed along opposite side faces of the body 1 and in the body are formed sockets 9 having openings 10 at their opposite sides which communicate with the grooves 8 and are connected by circumferentially extending grooves 11 formed in the walls of the sockets. Bosses 12 which surround front end portions of the sockets project forwardly through openings in the face plate and the forward portions of the sockets have their walls inwardly thickened and defining shoulders which have upper and lower portions formed with grooves 13 leading from beveled faces 14 about outer or front ends of the sockets and communicating with the grooves 11. Contact strips 15 which are formed of resilient conductive metal extend longitudinally in the grooves 8 formed along sides of the body and each has a shank 16 which fits snugly in a recess 17 where it is secured by a screw 18, the shank carrying a cross head 19 through which screws 20 are threaded so that a conductor wire may be attached to the upper or lower end thereof. The free end portions of the conductor strips are bent to form seats 21 which extend across the openings 10 and have their faces which confront the openings concaved. A resilient latch strip 22 which ex-

tends longitudinally of the rear or inner face of the body is secured midway its length by a screw 23 with its free end portions extending across the inner ends of the sockets diametrically thereof and engaged in recesses 24 so that the latch strip cannot move transversely of the body out of a proper position.

A shell 25 which is formed of insulation rotatably fits within each socket and is inserted through the rear or inner end thereof with its front end bearing against the shoulder through which the grooves 13 are formed and this shell has its inner end or bottom formed with a center opening 26. The free end portions of the resilient latch strip extend across the center openings of the shells and each shell has its rear wall formed with lugs or stops 27 from one of which extends a strip 28 that terminates in spaced relation to the other stop, as shown in Figure 5. Under normal conditions the end portions of the latch strip engage side faces of the stops 27 with a portion of one end of the latch engaged in the space 29 between the strip 28 and the stop from which it is spaced and this causes the shell to be normally held in the position shown at the bottom of Figures 1 and 3 with the slots 30 in opposite side portions of its annular wall in alignment with the grooves 13, as shown in Figure 3. As long as the latch strip in disposed in the space 29 it is impossible to turn the shell but when the latch strip is forced out of this space the shell may be turned a quarter revolution, at which time the ends of the latch will engage side faces of the two stops 27 and prevent further turning of the shell. The slots 30 will then be in registry with the openings 10. Upon turning the shell in an opposite direction the portion of the latch strip resting against the strip or flange 28 will slide along it until it reaches the space 29, at which time the latch will move into the space and its ends will have engagement with the two stops. The shell will then be firmly held in its initial position until the latch is again shifted out of the space 29.

Each of the shells is to receive a plug 31 which is formed of insulation and has a head 32 formed with a circumferentially extending beveled surface 33 to bear against the beveled surface 14 when the plug is thrust into the socket and engaged in the shell. A boss 34 having the form of a pin extends from the front end of the plug body centrally thereof and is of such length and diameter that when the plug is inserted the boss will pass through the center opening 26 of the shell and engage the latch strip and move the same out of securing engagement with the shell. Contact bars 35 formed of conductive metal are molded longitudinally through openings 36 in the plug body and at their inner ends carry wings 37 which extend laterally from the bars and project from opposite sides of the plug in position to pass through the slots 13 and 30 and engage in the circumferentially extending grooves 11 of the socket into which the plug is fitted. The plug is inserted in the socket and turned to the position shown at the top of Figure 6 and thus causes the wings 37 to engage the contact strips 15 to complete a circuit through an electrical appliance. Since the wings fit into the seats 21 of the contact strips the plug will not be liable to be accidently turned to its initial position and since the wings and the slots 30 are out of alignment with the slots 13 the plug will be firmly held in the socket. It is impossible to make contact with the strips 15 when the plug is in its initial position and accidental engagement of the contact strips by a finger or wire will be impossible. Therefore a person can not receive an electric shock by thrusting a finger into the socket and also the circuit can not be short circuited and a fuse plug blown out. As shown in Figures 7, 8, and 9, contact strips 35' formed of conductive metal extend longitudinally through openings 36' formed through the plug body where they are secured at their inner ends by wings 37' screwed into the strips and project from opposite sides of the plug to pass through slots 13 and 30. It is to be noted that in Figure 1 the wings 37 are integral with the contact bars 35. The contact strips are hollow from their outer ends so that the prongs 38 of a terminal 39 carried by an electric cord 40 may be thrust into engagement with the contact strips and secured against displacement by tightening screws 38' which frictionally engage insulation material 39' pressing it against prongs 38. Referring now to Figures 1 through 4, the wires of the electric cord 40 may be passed through an opening formed in a cap 41 formed of insulation. This cap is shiftable along the electric cord and after the wires of the cord have been secured to the contact bars 35 by screws 42 the cap is applied to the rear end of the plug where it is secured by screws 43. The portions 40' of the wires which extend laterally from the inner end of the opening formed through the cap are gripped between the cap and the plug and the wires can not be torn loose from the screws 42 if pull is applied to the electric cord.

Instead of forming the plug as shown in Figures 7, 8, and 9, it may be formed as shown in Figure 10. This plug 31' is similar in construction to the plug shown in Figures 7, 8, and 9 and is provided with contact strips corresponding to the strips 35 and terminating in wings 37' but a shell 43' formed of conductive metal and internally threaded is secured upon the rear end of the plug by fasteners 44. One of the contact strips of the plug engages the inturned flange 45 of the shell through which the fasteners 44 pass, the other contact strip 35' being extended outwardly to form a center contact 36''. Therefore a terminal plug carried by an electric cord and having a center contact and a threaded shell of conductive metal may be screwed into the shell 43' and a circuit completed through an electric appliance when the plug 31' is turned from its normal position to a position for engagement of its wings 37' with the contact strips 15.

In Figures 11 through 14 there have been shown sockets for use with drop cords. The socket illustrated specifically in Figures 11 and 12 has a housing 46 formed of insulation and about the lower end of this housing is formed a flange or annular wall 47. An insert or socket 48 fits into the housing with its annular wall spaced from the wall of the housing and at its upper end is surrounded by a head or collar 49 which is threaded and screwed into the internally threaded upper portion of the housing. The collar projects upwardly from the housing and upon its projecting upper portion is screwed a cap 50 through which pass the drop cord wires 51. The lower end of the socket bears against the flange 47 and within the housing fits a sleeve 52 which rests upon the flange and has its annular wall formed with diametrically opposed slots 53 in registery with the notches or recesses 54' formed in the marginal edge of the flange. The slots 53 communicate with openings 54' formed through the wall of the socket and extending circumfer-

entially thereof and when one of the plugs 31 is fitted into the shell with end portions of its contacts passing through the slots 53 and engaged in the openings 54' the shell may be turned and the contacts of the plug moved into position to engage the resilient contacts 55. These contacts extend circumferentially of the socket in grooves 56 and are secured by screws 57 and the free end portions of the contacts are bent to form seats 58 corresponding to the seats 21. In order to releasably hold the sleeve in the position shown in Figure 12 with the contacts of the inserted plug out of engagement with the contacts 55 there has been provided a latch strip 59 which is formed of resilient metal. This latch strip is bowed longitudinally and fits into a groove 60 with its ends projecting from the groove and engaged with the socket and its intermediate portion passing across an opening 61. When the plug 31 is inserted and the boss 34 thereof passes through the opening 61 the latch strip will be flexed upwardly ut of the groove or seat 60 and the sleeve may then be turned to a circuit closing position. One of the drop cord wires 51 is passed downwardly through an opening 62 formed diagonally in the upper portion of the socket and attached to the adjacent screw 57 and the other drop cord wire is connected with a screw 63 carried by a stationary contact 64 which is embedded in the upper portion of the socket and projects into a pocket 65 leading from the upper end thereof. A movable contact strip 66 formed of resilient metal is secured at one end to the other screw 57 and extends upwardly along the socket with its upper portion bent so that it extends into the pocket and terminates under the stationary contact. The movable contact is biased towards the stationary contact and in order to permit a circuit to be broken by separation of the movable contact from the stationary contact there has been provided a key 67 having its shank 68 rotatably mounted through an opening in the wall of the housing or shell 46 and engaged with a shaft 69 carrying a cam disk 70. By turning the key the shaft will be rotated and the cam will then press the movable contact downwardly away from the stationary contact and the circuit will be broken and when the key is turned in the opposite direction the movable contact will be allowed to return to its normal position in engagement with the stationary contact.

The socket shown in Figure 14 is of a somewhat different construction from that illustrated in Figure 11 but as certain elements of the socket are of the same construction the same reference numbers have been used to designate these parts. This socket is shorter than that shown in Figure 11 and as the drop cord wires are both connected with screws 57, the pocket, a stationary contact, and a companion movable contact and key for the movable contact are not necessary. It is therefore not necessary to provide a pocket in the upper portion of the socket to house the same. When the cap 50 is screwed upon the protruding upper end of the socket 48 portions of the two drop cord wires will be gripped between the cap and the upper end face of the socket and the wires will not be liable to be torn loose from the screws to which they are connected. In this embodiment of the invention closing of a circuit is only obtained by turning the sleeve 52 in the socket and moving the contacts of the inserted plug into engagement with the contacts 55.

In Figures 15 and 16 there has been shown a socket 71 of insulation which has mounted therein terminal contacts 72 of the double jaw type. A cap 73 is carried by the socket and closes outer ends of the compartments 74 in which the contacts 72 are mounted and edge faces of the cap at opposite ends thereof are formed with grooves 75 in which a ring 76 is rotatably mounted. Openings 77 are formed through the cap so that prongs of a terminal plug for an electric cord may be passed through the cap and engaged with the contacts 72 and in order that the prongs of the terminal plug may be secured against outward movement there has been provided pins 78 which are slidably mounted radially of the cap and extend between the grooves 75 and the openings 77. The ring is formed along its inner marginal portion with cams 78 for engaging outer ends of the pins and when the ring is turned in one direction the pins will be forced into gripping engagement with side faces of prongs of a terminal plug and firmly secure the prongs against outward movement. A tongue or handle 80 projects radially from the ring in order that the ring may be readily grasped and turned towards a position for forcing the pins inwardly or back to a position allowing the pins to move out of gripping engagement with terminal prongs and in order to limit turning movement of the ring and thus prevent movement of the cams to a position allowing removal of the ring from the cap there has been provided a screw 81 which serves as an abutment or stop for engaging an end of one of the cams when the ring is turned towards the normal position in which the cams are out of pressure applying engagement with the pins.

Having thus described the invention, what is claimed is:

1. A power outlet comprising a body having sockets formed with side openings, contacts having portions exposed through the openings and adapted to have power wires connected to them, said sockets having diametrically opposed entrance grooves leading from their outer ends and branch grooves extending from inner ends of the entrance grooves to the side openings, sleeves in said sockets rotatably mounted and each formed with side slots and with a center opening at its inner end, a latch consisting of a resilient strip secured to said body and having end portions extending across the inner ends of the socket and engaged in grooves formed across the inner ends of the sleeves to releasably hold the sleeves in a normal position, and plugs removably fitted into the sleeves and provided with contacts adapted to have conductor wires attached to their outer ends, the contacts of the plugs having arms projecting from opposite side portions of the plugs and having movement through the slots of the sleeve entrance grooves of the socket to the branch grooves thereof when the plugs are fitted into the sleeves, said plugs each having a pin extending from its inner end and passing through the center opening of the sleeve into which it fits and engaging the latch to move the latch out of the groove at the inner end of the sleeve and allow turning of the sleeve and consequent movement of the arms of the contacts of the plug through the branch grooves of the socket into position to enter the side openings of the socket and engage the contacts exposed therethrough when the plug and the sleeve are turned in the socket.

2. A power outlet comprising a body of insulation formed with longitudinally spaced sock-

ets open at each front and rear end and having an annular wall formed with tracks leading from its outer end and with internal circumferentially extending grooves leading from inner ends of the tracks to openings formed through opposite sides of the socket, contacts carried by the body and exposed through the side openings of the sockets, a sleeve in each socket having slots registering with the grooves and movable into and out of registry with the tracks by turning the sleeve in the sockets, a latch carried by said body and secured midway its length and having free end portions normally in position to engage the sleeves and secure the sleeves in a normal position with their slots in registry with the tracks of the sockets, a plug removably fitted into each sleeve and carrying contacts having portions projecting transversely therefrom for passing through the slots of the sleeves and the tracks of the sockets and engaged in the grooves of the sockets and having movement into engagement with the contacts of the body when the sleeves are turned with the plugs out of their normal position, and a member projecting from the inner end of each plug for moving the latch to a releasing position when the plug is thrust into the sleeve.

3. A power outlet comprising a body of insulation formed with sockets spaced from each other and open at front and rear ends and having side openings, the body being formed at opposite sides with longitudinally extending grooves with which the side openings communicate, contact strips mounted in said grooves and having shanks secured to the body with end portions projecting therefrom and adapted to have power wires secured thereto, shells rotatably mounted in said sockets and having side openings moved into and out of registry with the side openings of the sockets by turning movement of the sleeves, said sleeves having center openings at their inner ends communicating with seats extending diametrically across the sleeves, a latching strip extending longitudinally of said body along the inner face thereof and secured to the body between the sockets with end portions extending across inner ends of the sockets and normally engaged in the seats of the sleeves to hold the sleeves in a normal position, said sleeves having side openings for registering with the side openings of the sockets when the sleeves are turned to an adjusted position and also having slots leading to their side openings, plugs removably fitted into said sleeves and having projections at their ends passing through the openings at inner ends of the sleeves and engaging end portions of the latch strip to move the same out of the seats and permit turning of the sleeves in the sockets, and contacts extending longitudinally in the sockets and adapted to have conductor wires connected with their outer ends, said contacts having side arms projecting laterally from their inner ends and projecting from opposite sides of the plugs for passing through the side openings of the sleeves and causing turning of the sleeves with the plugs into and out of position for movement of the arms through the side openings of the sockets into engagement with portions of the contact strips.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,238,459	Tregoning	Aug. 28, 1917
2,119,428	Englar	May 31, 1938
2,240,614	Fuchs	May 6, 1941
2,454,221	Seals	Nov. 16, 1948

FOREIGN PATENTS

Number	Country	Date
1,581	England	of 1897
116,841	Germany	Jan. 3, 1900