

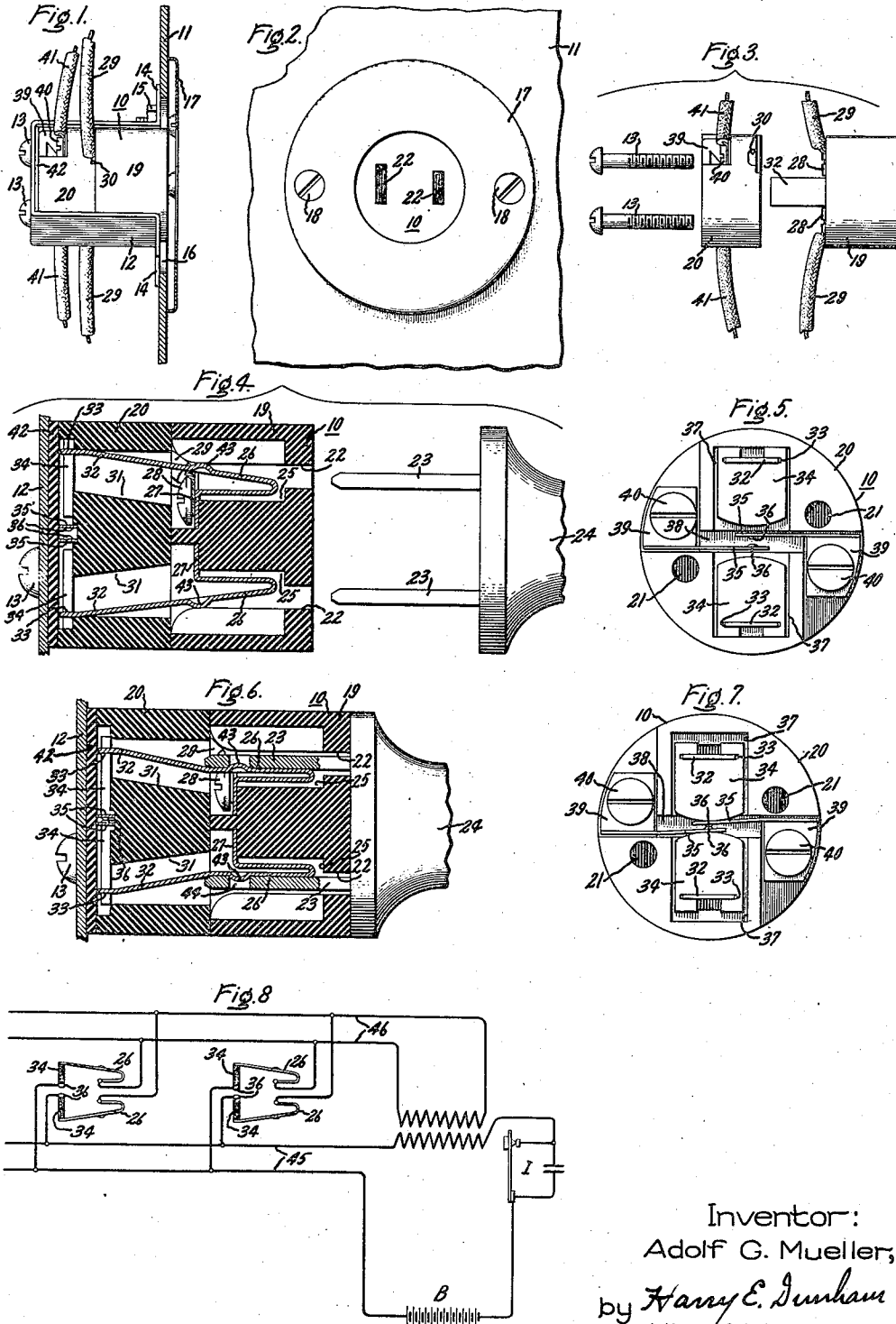
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COMBINED SWITCH AND PLUG RECEPTACLE

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COMBINED SWITCH AND PLUG RECEPTACLE

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This invention relates to a plug receptacle which incorporates an electric switch, the switch being operated by insertion of a plug connector into the plug receptacle.

The object of my invention is to provide an improved construction and arrangement in switches of this type and one which has a minimum of parts and is reliable in operation.

In the accompanying drawing, Fig. 1 is a side view of the receptacle mounted on a supporting panel; Fig. 2 is a front view of the receptacle in panel-mounted position; Fig. 3 is an exploded view of the switch parts; Fig. 4 is a sectional view of the plug receptacle in normal position before insertion of a connector plug and with the switch in open position; Fig. 5 is an end view of the switch structure in normally open position; Fig. 6 is a sectional view of the receptacle with a connector plug inserted therein showing the switch in closed position; and Fig. 7 is an end view of the switch in closed position; and Fig. 8 illustrates one use of the switch by way of an example.

Referring to the drawing, the numeral 10 indicates generally the receptacle housing which may be mounted upon a panel 11 by means of a U-shaped metal strap 12. The strap is secured to the housing by screws 13 and is formed with outwardly bent ears 14 for clamping to a panel by means of mounting screws 15. In mounted position the receptacle is disposed within an opening 16 formed in the panel 11 and is provided with a face plate 17 secured to the panel by screws 18.

As shown more particularly by Figs. 3 and 4, the housing 10 is formed of two portions of insulating material, which may be designated a terminal portion 19 and a switch portion 20 respectively. The two portions are secured together by the strap mounting screws 13 which are inserted in openings 21 for this purpose. The two portions cooperate to form a housing for the elements of the receptacle contacts and electric switch.

The terminal portion 19 of the housing is provided with a plurality of longitudinal slots 22 disposed in proper position to receive the prongs 23 of a connector plug 24; each of the slots 22 is provided with an offset recess 25 which receives a U-shaped spring terminal contact 26. In order to secure the contacts to the housing, they are provided with laterally extending terminals 27 cooperating with screws 28 which are screw-threaded to the housing. In addition, to securing the contacts in position, the screws 28

serve as connectors for the conductors 29 which are connected electrically to the terminal contacts 27. The conductors 29 extend from the housing through the slots 30 formed in the switch portion 20 of the housing. The U-shaped spring contact terminals are normally biased to provide separation of the arms of the U while the connector plug prongs are utilized to vary the separation of the arms whenever the plug is inserted into the receptacle. This variation in the spacing of the arms of the U-shaped contact is utilized to operate an electric switch.

The switch portion 20 of the housing is provided with longitudinal slots 31 aligned with the slots 22 and which receive extensions 32 forming part of the arms of the U-shaped contacts. The extended portions 32 of the contacts rest in slots 33 formed in sliders 34 which cooperate with spring contact clips 35. The clips carry contacts 36 which may be silvered. In order to insulate the contact extensions 32 from the contact clips 35, the sliders 34 are formed of insulating material. To provide bearing surfaces for the sliders 34 the housing 20 is formed with recesses 37 which adjoin the transverse recesses 38 in which the contact clips 35 are mounted. Each of the contact clips is provided with a terminal portion 39 cooperating with a terminal screw 40, the screw 40 being screw-threaded in the housing and serving as a terminal connection for the conductors 41. As shown by Figs. 4 and 6, the switch structure is located at the rear of the receptacle housing and is insulated from the mounting strap 12 by an insulating disk 42 secured in position by the screws 13.

It will be apparent from Figs. 4 and 6 that in normal position the U-shaped terminal contacts 26 of the plug receptacle are biased to provide separation of the arms of the U, so that the extensions 32 maintain the sliders 34 out of engagement with the spring contact clips 35, the spring action of the clips maintaining the contacts 36 in open position. However, when a plug connector is inserted in the receptacle the arms of the U-shaped contact are deflected by engagement with the plug prongs so that the sliders 34 are moved to cause interengagement of the spring contact clips and contacts 36. To provide for a better contact between the terminal contacts and the plug prongs, the former may be provided with projections 43 adapted to engage openings 44 placed in the latter.

The combined plug receptacle and switch, described above, may be used in various ways; for

example, the conductors 29 may be connected to the line voltage at the same time that the conductors 41 are connected to a separate source of current and pilot light or signal lamp to indicate that the receptacle is in use.

Another use of the device is illustrated by Fig. 8 wherein the switch is used to control an electrical apparatus to supply 110 v. alternating current to the terminal contacts 26. It is frequently desirable to provide 110 v. alternating current for electrical apparatus, such as electric shavers, in a railway car in which there is available only 32 v. direct current. In such instances, a vibrating type inverter 1 is placed in series with a 32 v. battery B and connected across the contacts 36 by the conductors 45, the power side of the inverter being connected to the contacts 26 by the conductors 46. Insertion of a plug connector into the receptacle will close the switch contacts 36 simultaneously with completion of the circuit from the power line contacts 26 to the plug prong contacts so that the inverter will be energized to supply 110 v. current to the plug receptacle. Such an arrangement obviates the necessity of a separate manual control for the inverter. Any number of plug receptacles may be installed in parallel, as shown by Fig. 8, to provide an instantaneous supply of alternating current at various points.

While several uses of the combined switch and plug receptacle have been described, by way of example, it should be understood that the device is not limited to such uses and may be used in other arrangements apparent to those skilled in the art.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. In a plug receptacle, circuit controlling means including movable contact blades, sliders adapted to engage each of said blades, and contacts adapted to cooperate with a plug connector, said contacts having flexible extensions engaging said sliders whereby said circuit controlling means is operated upon insertion of a plug connector into said receptacle.

2. In a plug connector, a circuit controlling means including a movable contact blade, a slider adapted to engage said blade to operate said circuit controlling means, and a U-shaped contact having a movable extension engaging said slider, said extension being moved by cooperation

of a plug connector with said U-shaped contact to operate said circuit controlling means.

3. In a plug receptacle, movable contact blades, sliders adapted to engage said contact blades, and a plurality of U-shaped contacts, one arm of the U of each contact being formed as a flexible extension to engage one of said sliders, said extensions being flexed upon engagement of said U-shaped contacts with a plug connector to operate said movable contact blades.

4. A plug receptacle comprising a base, longitudinal recesses formed in said base and adapted to receive the prongs of a connector plug, contacts disposed in said recesses, said contacts having flexible extensions adapted to be moved by said plug prongs, sliders connected to said extensions and movable transversely of said recesses upon flexing of said arms, and contact blades operated by said sliders.

5. A plug receptacle comprising a base, longitudinal recesses formed in said base and adapted to receive the prongs of a plug connector, U-shaped contacts disposed in said recesses, one of the arms of the U of each contact being secured to said base to form a terminal connection and the other arm of the U being elongated to form a movable extension, sliders engaging said extensions and movable transversely of said recesses, and contact members operated by said sliders.

6. In a plug receptacle, circuit-controlling means including movable contact blades, sliders adapted to engage each of said blades, contacts adapted to cooperate with a plug connector, and means interconnecting said contacts and sliders whereby said circuit-controlling means is operated upon insertion of a plug connector into said receptacle.

7. A plug receptacle comprising a base, longitudinal recesses formed in said base and adapted to receive the prongs of a plug connector, U-shaped contacts disposed in said recesses, one of the arms of the U of each contact being secured to said base to form a terminal connection and the other arm of the U being elongated to form a movable extension, contact members mounted on said base and being connected to said extensions whereby said contact members are operated upon engagement of a plug connector with said U-shaped contacts.

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