

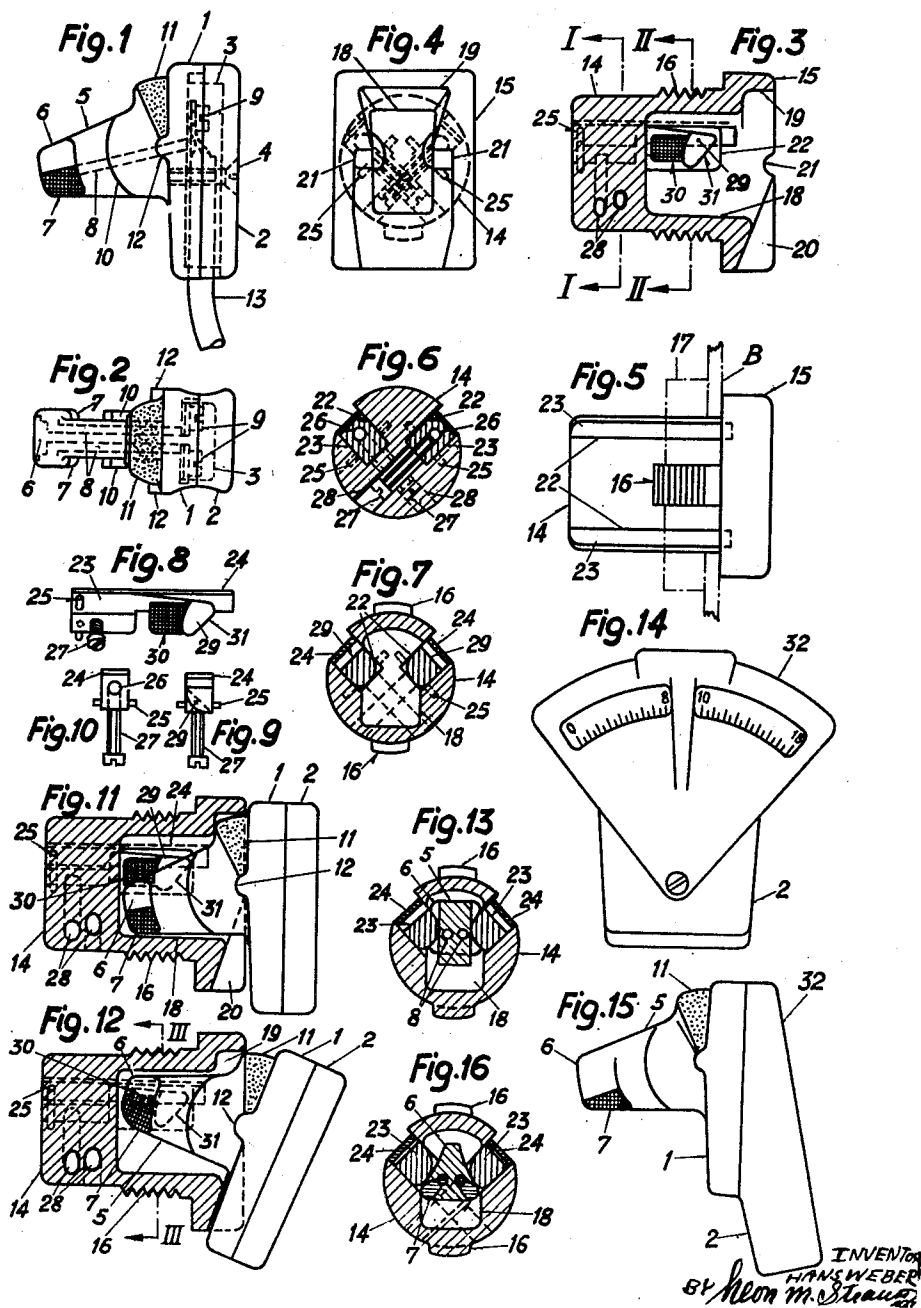
Dec. 19, 1950

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2,535,002

COMBINATION CONTACT PLUG

Filed Oct. 29, 1947



UNITED STATES PATENT OFFICE

2,535,002

COMBINATION CONTACT PLUG

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Application October 29, 1947, Serial No. 782,750

In Switzerland October 30, 1946

5 Claims. (Cl. 200—51.07)

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This invention generally relates to electric switches and more particularly to quick-acting plug-switch devices.

It is an object of the invention to provide means conducive to an effective combination socket and plug switch structure in which a movable plug and a stationary socket are designed to form a switch in a manner that two positions of engagement of the plug in the socket are attained when moving or swinging the plug, one position being that of making contact and the other position being that of breaking the contact.

This combination plug and socket structure is suitable for electric circuits and electric connections, etc. of all types. When used for automobiles said plug and socket structure performs excellent service as a switching appliance when mounted on the dash-board of a car. The switching appliance may be employed for switching on and off various electrical consumer units, such as battery chargers, battery-testers, wireless sets, heating appliances, heating pads, fans, dry-shaving razors, auxiliary lamps, electric windshield heaters, etc.

An advantageous feature of the invention is that the plug-socket structure may be utilized in conjunction with any desired type of electric rectifier to enable charging of a battery in the garage provided that at least an electric supply lead is available for the plug connectable to the socket in accordance with the invention.

Small appliances, such as battery testers, may be expediently arranged directly on the plug without cables, the negative serving as a holder. In this latter case the combination plug and socket structure can be designed to form a quick-acting switch.

The drawing illustrates a typical embodiment of the invention, in which represents:

Fig. 1 a side-elevational view of the plug;

Fig. 2 a top plan view of the plug of Fig. 1;

Fig. 3 a longitudinal section through the socket;

Fig. 4 a front view of same;

Fig. 5 a side-elevational view of same;

Fig. 6 a cross-section taken along line I—I in Fig. 3;

Fig. 7 a cross-section taken along line II—II in Fig. 3;

Fig. 8 a perspective view of the contact piece when placed within the socket;

Fig. 9 a front end view of same;

Fig. 10 a rear end view of same;

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Fig. 11 a longitudinal section through the combination socket and plug in off-position;

Fig. 12 a longitudinal section through the combination socket and plug in contact-closure position;

Fig. 13 a cross-section taken along line III—III in Fig. 12;

Fig. 14 an end view of the plug in combination with a battery testing appliance;

Fig. 15 a side elevation of the plug combined with the battery testing appliance and

Fig. 16 a transverse section of the socket and the contacts, with the plug inserted.

The combination socket and plug switch consists of two parts, to wit, the plug shown in Figs. 1 and 2 and the socket or plug-box shown in Figs. 3 to 5. The plug consists of two dished portions 1 and 2 which define a cavity 3 and are secured to each other by means of a holding screw 4. The dished portion 1 of the plug carries an angularly directed switching projection or nose 5 which in turn has a contact head 6 projecting in lateral direction, the lower portion of said contact head being formed by two laterally extending, separate contact pieces 7. These contact pieces 7 are connected by two separately arranged conductors 8 leading to the respective contact terminals 9. Elements 10 are two lateral guide-cheeks carried by switching projection 5, whereas 11 is a thickened portion coated with red color. From each side of the switching nose or projection 5 extends an axle or pivot 12 which is fixed to the front dished portion 1. 13 is the supply cable which leads to the cavity 3 of the plug, the pole wires of said cable being connected to the respective terminals 9.

The plug-box or socket has a cylindrical box-body 14 which has a front flange 15 and at 16 a screw-threaded portion for retaining the plug-box in a corresponding aperture of a dash-board of a car (not shown). The plug-box, inserted in the aperture of the dashboard B (Fig. 5), is secured in position by a threaded ring 17 which engages the screw thread 16. The plug-box 14 possesses an opening 18 at the front, which is preferably rectangular in section (see Fig. 4). Through opening 18 the switching projection 5 of the plug may be inserted for connection with socket 14. The opening is enlarged at the top to receive the thickened portion 11 of the switching projection 5. The lower portion of the flange is provided with a recess 29 defined by an oblique surface. At the front of the flange 15 a pair of bearings 21 are provided for receiving the pivots 12 of the plug. In the

upper half of the plug-body 14 are two elongated recesses 22 symmetrical in relation to the vertical central plane and communicating with opening 18, two contact pieces 23 being mounted in said elongated recesses. Rearwardly of each contact piece 23 extends a flat spring 24, which is spaced from the front end of each contact piece. 25 denotes the pivots of the contact pieces, said pivots engaging suitable bearings in the rear end of the plug-box body 14. The front end of each contact spring 24 engages a groove provided in the body rearwardly of the flange 15. The front end of each contact piece 23 can be pressed against the respective flat spring by a pivotal movement about the respective pivots 25. The rear extremities of the contact pieces 23 are designed to form connecting terminals, the ends of the electric conductors which pass through the lead-in holes 26, being held in place by terminal screws 27 within bores or holes 28. The front extremities of the contact pieces are provided with inclined insulating heads 29 adjacent portions 30 of said contact pieces 23 lying rearwardly of the heads serve as points of contact. The insulating heads 29 of the contact pieces are provided with downwardly directed oblique surfaces 31 against which the head 6 of the switching projection of the plug bears when the latter is inserted in the socket 14.

The plug is inserted with its switching projection 5 through the lower portion of the opening 18, the front ends of the contact elements 30 being then forced back against the action of the flat springs for engagement with the head of the switching projection when the plug is completely inserted, thus holding the plug elastically since the insulating heads 29 grip the back of the head of the switching projection, as shown in Fig. 11. In this position the contacts are in off-position. If it is desired to close the contacts, pressure is exerted on the lower portion of the plug, this causing the plug to swing about the pivots 12 from the position shown in Fig. 11 to that shown in Fig. 12. The result of this swinging movement is that the ends of the contact pieces are forced slightly backwards and the contact surfaces 7 of the head of the switching projection are pushed on to the contact surfaces 30 of the contact pieces. At the same time the red-painted portion 11 of the plug becomes visible at the enlarged portion of the opening 19 of the plug box from which portion 11 projects to indicate that the switch is closed. The switch is opened by pressure on the upper portion of the plug 1, 2, that is to say by pivoting the plug 1 about pivot connection 12-21 to assume a position shown in Fig. 11.

The contact plug described can be directly connected to an electrical apparatus or appliance, instead of being connected to cables 13, provided that the said apparatus or appliance is suitable for combination with a plug. This applies, for instance, in the case of a battery-tester, as shown in Figs. 14 and 15. Here the number 32 indicates the testing appliance, which carries incorporated therein the plug 1 with a projection 5 as a single unit. The plug operates in this case as a quick-break switch, for which purpose the head 6 of the switching projection has a cross-section tapered towards the top in the fashion of a wedge, and the contact pieces 7 are located on the wider, lower portion of the head. As a result of the wedge-shaped

design, of the head 6, when the plug is swung from the position shown in Fig. 11 into that shown in Fig. 12 the contact pieces are slowly forced apart, and at the end of the movement contact is closed. When the pressure on the lower portion of the plug 1, 2 is relaxed, the elastic pressure of the contact pieces 23 on the wedge faces of the head 6 of the switching projection swings the plug back into its initial position as in Fig. 11. Contact is maintained only during such time as pressure on the lower portion of the plug continues. The battery-tester is read the first time when the battery is not under load, and a second time while the starter is being operated. These measurements provide data relating to the charge and the battery. If the needle of the instrument drops below a certain limit marked on the scale, recharging of the battery is necessary.

The combined plug and socket structure can advantageously be employed in connection with low voltage and high voltage circuits. Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

I claim:

1. A combination plug and socket switching structure comprising a plug body including an angular projection, said projection being provided with outwardly converging walls terminating in an enlarged forward end, spaced apart contact pieces provided at said forward end, a socket body provided with walls defining an opening to facilitate insertion of said projection of said plug body into said socket body, spaced apart contact elements supported within said opening of said socket body and engageable with said enlarged forward end of said projection to releasably retain the latter within said opening, and means detachably pivoting said plug body on said socket body to thereby swing said projection to one position in which said contact pieces and said contact elements are in engagement with each other and one of said converging walls of said projection extends substantially parallel to a wall of said opening, and to another position in which said contact pieces are out of engagement with said contact elements and the other of said converging walls of said projection is substantially parallel to another wall of said opening.

2. A combination plug and socket switching structure comprising a plug body including an angular projection, said projection being provided with outwardly converging walls terminating in an enlarged forward end, spaced apart contact pieces supported by said forward end, a socket body provided with an opening facilitating insertion of said projection of said plug body into said socket body, spaced apart contact elements springedly supported within said opening of said socket body and engageable with said enlarged forward end of said projection to releasably retain the latter within said opening, a recess having an oblique surface and communicating with said opening of said socket body, and pivot means connecting said plug body with said socket body to thereby swing said projection to one position in which said contact pieces and said contact elements are in engagement with each other and said plug body abuts against said oblique surface of said recess, and to another position in which said contact pieces are out of engagement with said contact elements.

3. A combination plug and socket switching

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structure comprising a plug body including an angular projection terminating in an enlarged, free forward end, spaced apart contact pieces supported by said forward end, a socket body provided with an opening facilitating insertion of said projection of said plug body into said socket body, spaced apart contact elements each provided with an insulating head and springedly supported within said opening of said socket body, said enlarged forward end of said projection being engageable with and positioned rearwardly of said insulating heads to releasably retain said projection within said opening, an oblique surface at the front of said socket body and extending into said opening of the latter, 10 and pivot means swingably connecting said plug body with said socket body to thereby move said projection to one position in which said contact pieces and said contact elements are in engagement with each other whereby said plug body 20 abuts against said oblique surface, and to another position in which said contact pieces are out of engagement with said contact elements.

4. A structure according to claim 3, including a signalling surface provided on the opposite end 25 of said projection and exposed to view, when said plug body abuts against said oblique surface in

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contact engagement position of said contact pieces and said contact elements.

5. A structure according to claim 3, wherein said opening of said socket body is of rectangular shape, said spaced apart contact elements within said socket body being angularly arranged with respect to each other and project into said opening.

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