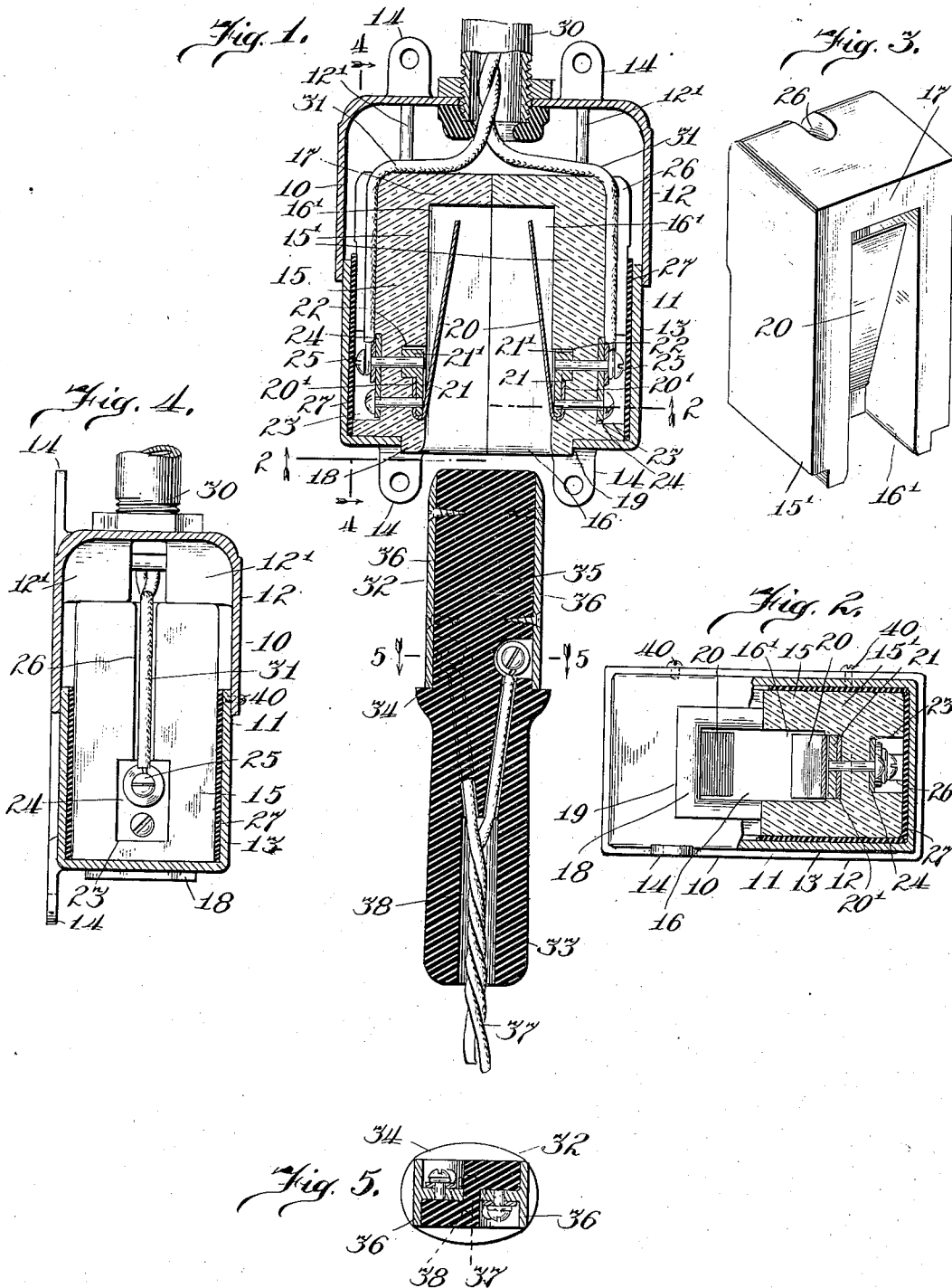


F. J. RAVLIN.
ELECTRIC SWITCH.
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Patented Feb. 1, 1916.



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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

1,170,190.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FREDERICK J. RAVLIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates to improvements in plug switches for effecting electrical connection between respectively fixed and portable electrical contact parts. Such plug switches generally comprise a receptacle or socket to be permanently located as a terminal for the fixed wiring to carry the stationary contact members, and a plug adapted for insertion in the socket, carrying the complementary removable contact members for electrical connection with the portable wiring. Such switches are often located in places where they are exposed to the weather, and are subject to rough usage and abuse, as for instance, in railway shops and yards, machine shops, and the like.

One of the principal objects of my invention is to provide a plug switch, in which the socket or receptacle member is of rugged and weather-proof construction, susceptible of withstanding hard usage and adverse weather conditions without breakage, dislocation, or deterioration of its mechanical parts, or interference with its electrical connections.

A further object of my invention is to provide a socket structure of simple, and relatively cheap, construction, and having its parts constructed for cheapness in manufacture, and for facility in assembling, repairing, and connecting its parts.

Other objects of my invention will become apparent to those skilled in the art from the following description taken in conjunction with the accompanying drawing, in which I have illustrated a practical embodiment of my invention.

In said drawings, Figure 1 is a central vertical section of the socket and plug member detached; Fig. 2 is a horizontal view partly in elevation, and partly in section on line 2—2 of Fig. 1; Fig. 3 is an enlarged perspective detail of an insulating block and contact; Fig. 4 is a section on line 4—4 of Fig. 1; and Fig. 5 is a section on line 5—5 of Fig. 1.

In the drawings, 10 indicates in general the socket or receptacle member, and 32 the plug member. The socket or receptacle in-

cludes a metallic casing or shell, 11, preferably formed of an upper shell member 12 and a lower shell member 13, the latter preferably having its upper edge telescopically fitting into the upper casing member 12. Each casing member is preferably provided on its rear wall with apertured extension ears, 14, to be suitably secured to any support, as a post or the like, and additionally, if desired, the overlapping portions of the two shell members may be secured together as by screws 40, as shown in Fig. 2. Within the lower shell 13 is mounted the insulating base 15, carrying the stationary contacts. The contact base is preferably made in two duplicate sections 15', of insulating material, meeting in a vertical plane traversing the casing from front to back and is preferably slip-fitted in the casing, that is to say, positioned in the casing only by inclosure and frictional engagement, so that the base may be slipped out of the casing and replaced without the use of extraneous fastening means.

In the inner vertical face of each base member 15' is made a recess 16', extending from the bottom of the insulating member to a top wall 17 thereof, so that when the two members are placed face to face the recesses 16' form a bottom opening socket 16, closed in all lateral directions and at its top by an insulating material. The bottom opening of the socket 16 is surrounded by a lip 18 of the insulating material, neatly interfitting in a bottom opening 19 in the bottom of the lower shell member 13, and preferably projecting slightly beyond the bottom of the said shell when the parts are assembled. Upon the confronting inner faces of the socket or back walls of the recesses 16', which are preferably parallel with the plane of separation of the insulating blocks, I mount the contact springs 20—20. Preferably each spring has its lower extremity bent up into an anchorage tip 20', overlain by an anchor plate 21, which is preferably provided with a boss 21', and which lies, together with the anchorage tip 20' of the spring, in a properly shaped pocket, 22, countersunk in the insulating base, so that the heel of the spring is substantially flush with the wall of the recess 16', and so that the lower end-portion of the spring infolds the thinner part of the anchor-plate 21. Exteriously, the side wall of each contact base section is provided with a recess 23 in which

is located a metallic plate 24 giving foundation to a contact screw 25 taking through the plate 24 and insulating wall into the boss 21', and to a screw 25', which extends through the anchorage tip 20' of the contact spring 20 into the plate 21. The recess 23 communicates with a channel 26, extending vertically along the outer side face of the base section to the top thereof, and the wiring channel thus provided is preferably overlain by an insulating strip 27 of fiber or the like, interposed between the side wall of the insulating base and the corresponding wall of the shell member 13. Enough thin strips of such insulating material 27 are preferably employed to wedge the insulating base members tightly in the lower shell member against lateral spreading. The upper shell member 12 is preferably provided with an interior spacing rib 12', projecting downward from the top and inward from the front and back walls thereof to rest upon the top wall of the insulating blocks, thereby to retain the insulating blocks against vertical displacement and, preferably, also to position the top section vertically with respect to the lower casing-section. The top of the cover member 12 may be apertured appropriately to receive the ordinary conduit fitting 30, of well known construction, and the wires 31 are led from said conduits respectively to right and left over the top of the block 15', between the spacing webs 12', and down the wiring channel 26 for electrical connection with the contact screws 25.

It will be observed that when the casing members are separated, the two contact carrying blocks 15' are free independently to be slipped out of their place in the circumferentially retaining lower shell member 13, so that they may be handled and wired as separate units, or individually repaired or replaced, yet when the plugs are in place in the shell, the block is adequately braced in every direction by the metallic shell member so as not to be liable to fracture, damage, or displacement from the effect of long continued rough usage, this durability and ruggedness being a salient object of the invention.

It will be observed that the switch socket is completely housed to prevent deterioration of its contact parts from the weather, its sole opening being in its bottom, and being in large measure protected by the lip 18, which tends to cause the moisture to drip from around the orifice rather than to film over the contact parts.

The associated plug 32 may be of any desired construction and preferably comprises a handle 33 of wood, fiber, or like insulating material of relatively infrangible character, terminating at a shoulder 34 beyond which extends the blade 35, bearing on its side faces the contact strips 36, screwed or other-

wise secured thereto and connected with the portable wiring 37, the wires of which extend through the usual wiring passages 38 in the handle. It will be observed that the size relation of the plug to the orifice of the socket and the position of the stationary contacts 20 make impossible a short-circuiting of the two separated contacts 20 by a single contact 36 of the plug, and the strong yet flexible mounting of the stationary contact springs 20 makes easy the insertion of the plug into its socket, and prevents displacement of the springs under long use.

While I have herein described in some detail a particular embodiment of my invention, it will be apparent that many changes in the details of construction might be made without departure from its spirit and within the scope of the appended claims.

What I claim is:

1. In a plug-switch receptacle-member, the combination of upper and lower metallic casing sections, slip-fitting telescopically, jointly forming a casing closed circumferentially and having top and bottom walls, there being a wiring orifice in one section and a plug orifice in the bottom wall; means on each said casing section for attachment thereof to a suitable support; an insulating base slip-fitted in the casing and otherwise free therefrom, said base receiving bearing in all directions from the casing and thereby positioned against movement in the casing, said base having therein an end-opening socket adapted to receive a push plug and registering with the plug orifice in the bottom wall of the casing; and contacts within the socket carried by said insulating base.

2. As an article of manufacture a weather proof plug-switch receptacle-member, comprising, in combination, a plurality of insulating-base sections, meeting at their longitudinal edges and there suitably recessed to provide an end-opening socket; contacts carried by said sections respectively mounted on the back walls of the socket; and a casing comprising upper and lower sections each provided with exterior apertured ears for attachment to a suitable support, said casing sections telescopically interfitting and jointly encompassing the base sections to give them bearing in all directions and to position them by inclosure, the lower casing member having a plug receiving orifice registering with the end opening socket of the base, and the upper casing section having a wiring orifice and being otherwise closed throughout.

3. In a plug-switch receptacle-member the combination of upper and lower metallic casing sections, slip-fitting telescopically, jointly forming a casing closed circumferentially and having top and bottom walls, there being a wiring orifice in one section

and a plug orifice in the bottom wall; an insulating base, slip-fitted in the lower casing section to receive lateral and end bearing therefrom, and having end engagement with the upper casing section to position the latter vertically with respect to the lower casing section, said base having therein an end opening socket adapted to receive a push plug and registering with the plug orifice in the bottom wall; and contacts within said sockets carried by the base.

4. In a plug-switch receptacle-member the combination of upper and lower metallic casing sections, slip-fitting telescopically, jointly forming a casing closed circumferentially and having top and bottom walls, there being a wiring orifice in one section and a plug orifice in the bottom wall; an insulating base, slip-fitted in the lower casing section to receive lateral and end bearing therefrom, and having end engagement with the upper casing section to position the latter vertically with respect to the lower casing section, said base having therein an end opening socket adapted to receive a push plug and registering with the plug orifice in the bottom wall; contacts within said sockets carried by the base and means for uniting said casing sections.

5. In a plug-switch receptacle-member, the combination of a plurality of insulating base sections, meeting at their longitudinal edges and there providing jointly an end opening socket, contacts carried by said respective sections mounted on the back walls of the socket, and a separable part casing, surrounding said base, receiving its sections in slipped-in relation and affording them bearing in all directions to position them only by inclosure, said casing having a plug receiving orifice registering with the end opening of the base socket.

6. In a plug-switch receptacle-member a two part casing, comprising upper and lower casing members telescopically interfitted to form an inclosure having a top wiring orifice and a bottom plug-receiving orifice, and otherwise closed throughout; an insulating base slip-fitted therein, receiving bearing in all directions from the casing, said base comprising a plurality of sections having their vertical edges meeting and recessed along said edges from one end to form jointly an end-opening plug-receptive socket registering with the plug receiving orifice of the casing, and spring contacts on the back walls of said recesses.

7. In a plug-switch receptacle-member, an insulating base comprising a plurality of sections meeting at their longitudinal edges and recessed along their meeting faces from one end, jointly to provide an end opening socket; spring contacts within the socket mounted on the back walls of the recess sections, and tending when under plug-insertion stress to separate said sections and

move them longitudinally, and a casing providing two separable parts jointly encompassing said sections to give them bearing in all directions and to position them by inclosure, said casing having a plug receiving orifice registering with the end opening of the base socket and having a wiring orifice and being otherwise closed throughout.

8. In a plug-switch receptacle-member, an insulating base comprising a plurality of sections meeting at their longitudinal edges, and recessed along their meeting faces from one end, jointly to provide an end opening socket, contacts within the socket mounted on the back walls of the recesses, and a casing, comprising a lower portion providing a bottom wall having a plug receiving orifice therein registering with the base socket and providing side walls, shorter than the insulating base, affording bearing therefor in all lateral directions, and a top portion, telescopically interfitted with said lower portion, and having end bearing on the insulating base sections, whereby the insulating base and the casing top mutually position each other, and means whereby the casing parts are adapted to be secured in position, longitudinally, with respect to each other.

9. In a plug-switch receptacle, the combination of an insulating base providing an end opening socket, said base consisting of two independent sections meeting in a plane vertically traversing said socket, contact members carried on the back walls of the socket, and a casing, comprising two members separable in a plane transverse to the meeting plane of the base section, one of said members closed throughout its perimeter and affording bearing in all lateral directions to the base sections, the end wall of said casing member giving bearing to the base section and having a plug receiving orifice therein, and the other casing member affording bearing to the opposite ends of the base sections, whereby said sections are held against lateral and longitudinal displacement through inclosure by the casing.

10. In a plug-switch, the combination of an insulating base comprising independent plural sections meeting at their longitudinal edges, recessed jointly to form an end opening socket, contact members on the lateral back walls of said socket, a casing wherein said base sections are mounted affording bearing to said sections in all directions and positioning said sections in relation to one another by its inclosure thereof, said casing having a plug receiving orifice registering with the base socket; and a plug adapted to slip longitudinally into said socket, said plug carrying lateral contacts complementary to the base-carried contacts, one of the complementary contacts being laterally yielding,

so that plug insertion exerts a stress tending both to separate the base sections and to move them axially.

11. In a plug-switch, the combination of
5 a casing, means for attachment thereof to a support, said casing comprising two portions separable on a transverse plane and telescopically interfitting, the lower section having a bottom plug receiving opening and
10 the upper section having a wiring opening, and said upper section having portions of its interior at different elevations to provide internal bearing portions and intermediate spaces for wire accommodation, said casing
15 being peripherally closed throughout; an insulating base comprising a plurality of independent similar sections, meeting at their vertical edges, each having a recess extending from its lower end and jointly
20 forming a socket registering with the plug orifice of the casing, said sections receiving bearing from the casing laterally and at the bottom, and at the top coacting with the internal bearing portions of said upper casing
25 sections; a plug longitudinally slidable into the socket, and complementary contacts on the plug and the base, one of said contacts being laterally resilient, and the base
30 carried contacts being arranged on the back walls of the recesses in the respective base sections.

12. In a plug switch receptacle member, the combination of upper and lower casing sections, each closed throughout its sides,
35 said sections telescopically interfitting to form a casing, the upper section having a wiring opening and the lower section having a plug orifice in its bottom, an insulating base comprising two sections extending
40 vertically side by side inserted in said lower casing section and retained against upward displacement by the upper casing section, said base having a socket formed therein
45 registering with the bottom orifice of the lower casing section, a lip on said insulating base surrounding the socket and extending into the orifice in said lower casing member, and contacts carried by the insulating base.

13. In a plug switch receptacle, the combination of an insulating base comprising
50 two separable sections having confronting recesses mutually to form a socket, each said section having an exterior wiring groove, a contact spring in each section located in the
55 socket and an electrically connected wire receiving part therefor located in the appropriate wiring groove, a metallic casing comprising two telescoping members respectively forming the lower and upper portions
60 of the casing, the lower member telescoping within the upper member and having an orifice therein registering with the socket in the insulating base, and insulating strips interposed between the grooved surfaces of
65 the insulating section and the lower casing

member to overlie the wire receiving parts in the respective wiring grooves and to assist in retaining the base sections against lateral displacement in said lower casing member.

14. In a plug-switch receptacle, the combination of an insulating base providing a
70 socket having inwardly facing recesses in its back walls, and having wiring grooves on the exterior of said back walls; opposing
75 contact springs, each having one end doubled back to form an anchorage lip and lying in the inwardly facing recess, so that the heel of the exposed portion of the spring lies substantially flush with the back wall
80 of the socket; anchorage plates overlying said spring lips and underlying the spring leaves proper, contact screws engaging the anchorage plates and extending through the
85 insulating base into the respective wiring grooves to secure the anchorage plates and contact springs; a metallic casing investing said insulating base, and insulating strips
90 interposed between the grooved exterior portions of the insulating base and contiguous portions of the metallic casing.

15. In a plug switch receptacle, the combination of an insulating base providing a
95 socket, and exterior wiring grooves, opposing contact springs, each having one end doubled back to form an anchorage lip underlying the spring-proper, anchorage plates
100 overlying said lips and underlying the springs proper, plates in the wiring grooves opposing the anchorage plates, and screws extending through the insulating base to connect said anchorage plates and contact plates.

16. In a plug switch receptacle, the combination of an insulating base, comprising
105 two sections having confronting recesses mutually forming an end-opening socket, a lip formed on the parts of said insulating base surrounding the orifice of said socket, contact members in said socket, respectively
110 carried by the insulating sections, a lower casing member encompassing the insulating section provided with an orifice in which interfits the insulating lip, and an upper
115 casing member telescoping over the first said casing member, provided with separated parts for bearing on the top of the insulating base, and provided with a wiring orifice.

17. In a structure of the character described, the combination of duplicate insulating
120 base-sections, said sections jointly providing a vertical socket having its opposed side walls respectively in the two sections, and said socket having an end opening
125 through the bottom of the said sections, contact springs on the opposed side walls of the respective sections, each said spring being secured to the section adjacent to the end opening of the socket substantially flush with
130

the appropriate socket wall, terminal members connected with said springs and extending through the opposed socket walls into grooves provided therefor in the exterior faces of said walls; a lower casing member closed throughout its perimeter and having a bottom opening alining with the socket opening, said lower member being shorter than the insulating base sections and retaining them laterally against displacement, and an upper casing member coöperating with the first, provided with a wire receiving orifice and otherwise inclosing the entire top portion of the insulating sections, and ribs on said upper casing member coacting with the top of said insulating sections, to retain them in position against vertical displacement.

18. In a plug switch, the combination of a plurality of insulating-base sections, meeting at their longitudinal edges and having in their proximal faces recesses, each extending from one end of the section, jointly to form an end opening socket; contacts carried by said sections, each mounted on the back-wall of its appropriate recess; a base-container, affording bearing for the sectional base in all directions and thereby positioning the base sections against separation or axial movement, said container ar-

anged to leave the base-socket unobstructed, and a contact-carrying plug insertible in said socket for coaction with the contacts therein.

19. In a plug switch, the combination of a plurality of insulating-base sections, meeting at their longitudinal edges and having in their proximal faces recesses, each extending from one end of the section, jointly to form an end opening socket closed at its upper end; leaf spring contacts within said socket, one mounted on the back wall of each recess near the open end thereof, and extending longitudinally toward the closed end of the socket; a plug adapted for longitudinal insertion in said socket and provided with coöperating contacts; and a structure encompassing and affording bearing for the sectional base in all directions, thereby to position said base sections against separation or axial displacement under the axial and spreading thrust of the plug against the spring contacts.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

FREDERICK J. RAVLIN.

In the presence of—
FORÉE BAIN,
MARY F. ALLEN.