July 5, 1949. C. MILLER 2,475,149

PLUG AND RECEPTACLE CONSTRUCTION

Filed Dec. 21, 1945 2 Sheets-Sheet 1

Fig. 1.

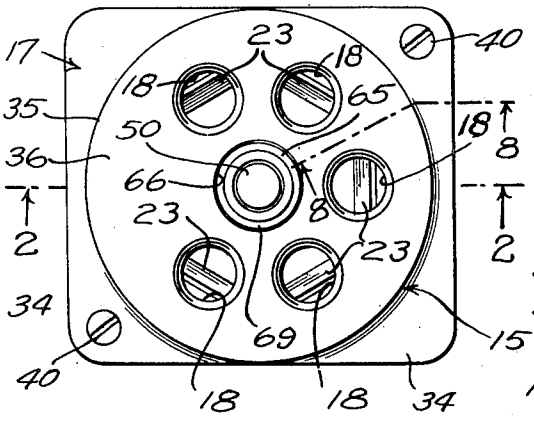


Fig. 3.

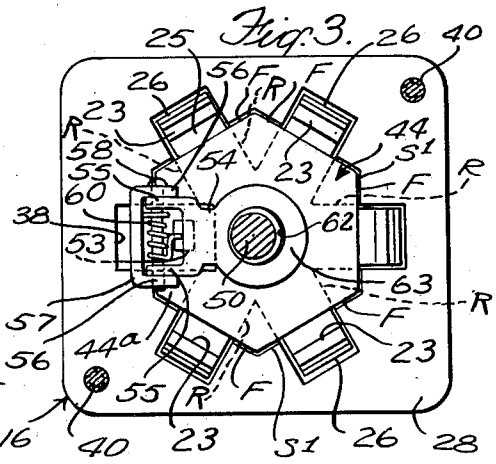


Fig. 2.

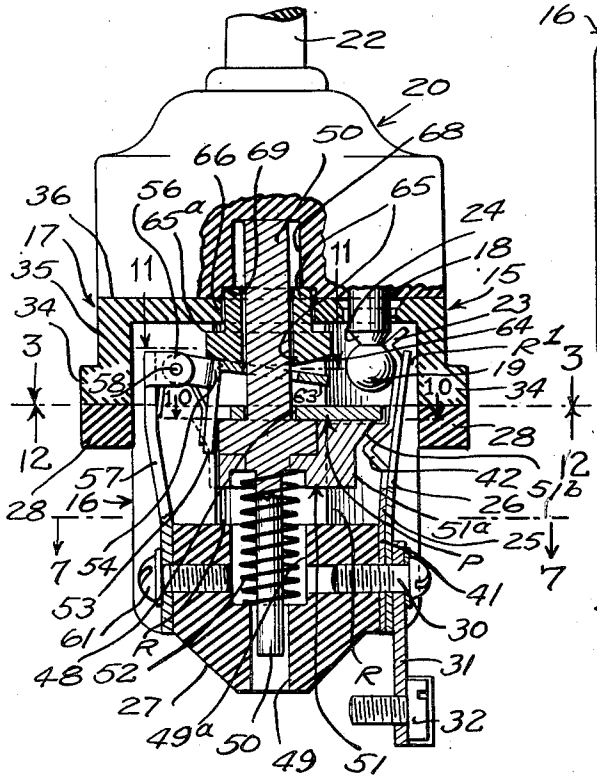


Fig. 4.

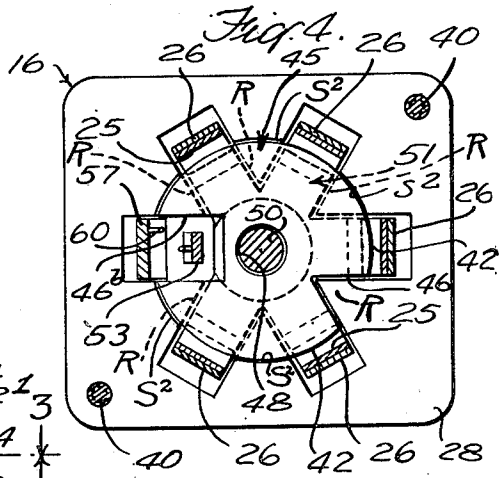
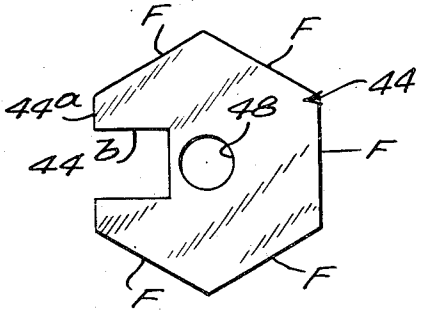


Fig. 5.



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Fig. 7.

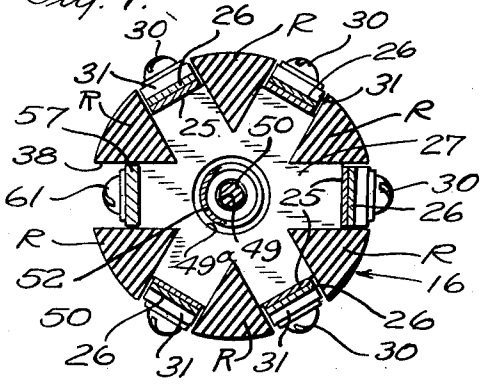


Fig. 6.

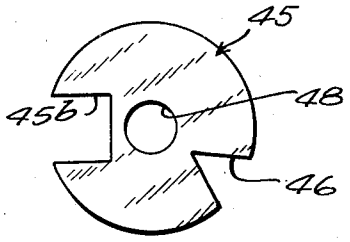
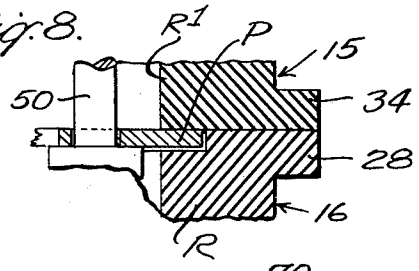


Fig. 8.



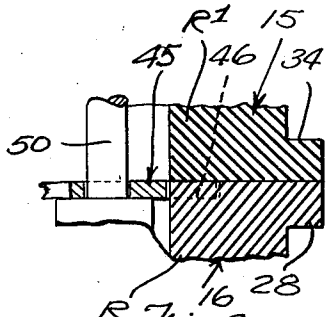
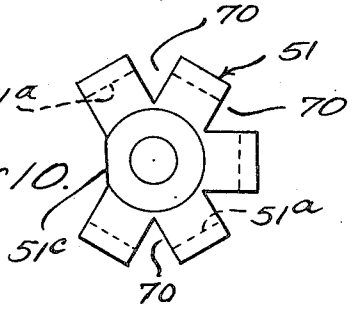


Fig. 9.

Fig. 10.



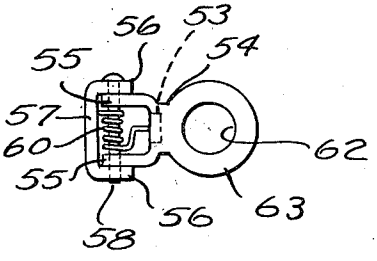


Fig. 11.

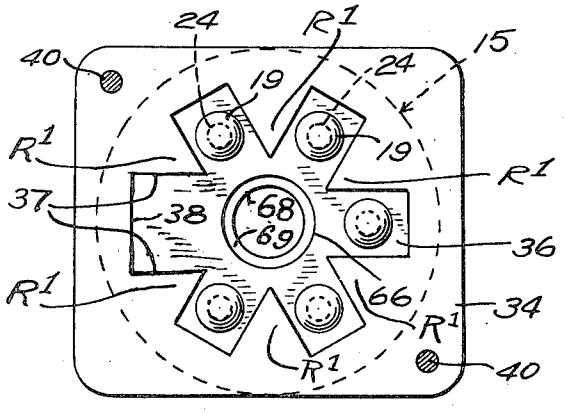


Fig. 12.

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UNITED STATES PATENT OFFICE

2,475,149

PLUG AND RECEPTACLE CONSTRUCTION

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Application December 21, 1945, Serial No. 636,481

16 Claims. (Cl. 200—51.10)

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This invention relates to disconnectable plug and receptacle construction, particularly of the kind employed in hospital signalling systems wherein the patient's push-button switch is connected to the signalling circuits by way of a plug that is connectable to and disconnectable from a receptacle or outlet which is usually installed in the wall of the room.

One of the objects of this invention is to provide a practical and reliable signalling plug and receptacle construction in which the signalling circuits are activated in response to disconnection of the plug from the receptacle and in which the restoration of the signalling circuits to inactive condition may be effected in a simple, practical, and dependable manner. Another object is to provide a plug and receptacle construction of the above-mentioned character in which change-over from inactive to active condition of the signalling circuits, and vice versa, can be effected in a foolproof manner and by structural features that will be compact in construction, capable of facility of assembly, and of long-lasting and dependable action. Another object is to provide a construction of the above-mentioned character in which manual change-over of the condition of the signalling circuit can be effected in a simple way and by structural features that will make for ease and certainty of actuation or control by attendants who, therefore, need not be skilled in electrical complexities of the circuit arrangement or the like. Another object is to provide, in a construction of the above-mentioned character, simple, compact, and reliably-acting coacting mechanisms or devices for effecting change-over of circuit conditions when the plug is reinserted in the receptacle and to provide dependable and uncomplicated mechanisms for effecting, for the just-stated purpose, dependable coactions between the plug and the receptacle. Another object is to provide, in a plug and receptacle construction of the above-mentioned character, mechanisms or devices for effecting change-over of circuit conditions that will have the advantages of utilizing the simple straight-line movement of assembly of the plug to the receptacle. Another object is, in general, to provide a structurally and functionally improved plug and receptacle construction, and other objects will be in part obvious or in part pointed out hereinafter.

In the accompanying drawings, in which are shown several illustrative embodiments of my invention,

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Fig. 1 is a plan view of the receptacle, with the plug removed;

Fig. 2 is a central vertical sectional view as seen along the line 2—2 of Fig. 1, and showing in side elevation and partly in central section the plug for coaction with the receptacle;

Fig. 3 is a transverse sectional view as seen along the line 3—3 of Fig. 2;

Fig. 4 is a view like that of Fig. 3 showing a modified form of construction of certain features;

Figs. 5 and 6 are elevations of short-circuiting elements employed respectively in the constructions of Figs. 3 and 4;

Fig. 7 is a transverse sectional view as seen along the line 7—7 of Fig. 2;

Fig. 8 is a fragmentary vertical sectional view along the line 8—8 of Fig. 1;

Fig. 9 is a fragmentary vertical sectional view as seen along the line 9—9 of Fig. 4;

Fig. 10 is a horizontal sectional view along the line 10—10 of Fig. 2, certain parts being omitted;

Fig. 11 is a top plan view of a plug-actuatable device forming part of the receptacle construction as seen along the line 11—11 of Fig. 2; and

Fig. 12 is a bottom view of a part of the receptacle closing structure as seen along the line 12—12 of Fig. 2.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring first to Fig. 2, the receptacle, generally indicated as a whole by the reference character 15, preferably comprises two parts, a lower part 16 and an upper part 17, preferably made, as by molding, of an insulating material such as Bakelite; the lower part 16 is shaped to provide for the ready mounting thereon of the contact springs and connecting terminals therefor, and the upper part 17 is arranged to provide the necessary number of holes 18 (see Fig. 1), illustratively five in number, for the passage therethrough of the plug contacts 19 of the plug which is generally indicated by the reference character 20 in Fig. 2. A suitable disposition of the holes in the part 17 is indicated in Fig. 1, and the contacts 19 of the plug are similarly disposed for ready reception into and through the holes.

The plug contacts 19, when entered into the holes 18, are each to make electrical contact with a receptacle contact spring, thus to extend the circuits of the latter to the pushbutton switch (not shown) which is connected to the end of the flexible multiple conductor or cord 22 and which is constructed in known manner to effect

closure simultaneously of a number of signalling circuits, usually four in number where five plug contacts are employed, the fifth plug contact and its associated receptacle contact spring being connected in a return circuit common to the rest. Preferably the plug contacts and the receptacle contact springs are suitably constructed to effect mechanical interengagement so as to releasably hold the plug 20 assembled to the receptacle 15, and this I may effect by giving the upper end of each contact spring V-bends, as at 23, to become seated in a V-groove 24 in the plug contacts 19, the extreme ends of the latter being rounded over as shown in Fig. 2 to facilitate camming of the V-bend 23 into and out of engagement with the V-groove 24 as the plug is assembled to or removed from the receptacle.

The five receptacle contact springs are preferably of identical construction, each comprising an elongated flat spring 25 and a flat backing spring 26, both made of a suitable material such as Phosphor bronze or the like, and together they are carried by the lower receptacle part 16 to extend upwardly into appropriate relationship to the holes 18 in the upper part 17.

The lower part 16 is molded or shaped to have at its lower end a relatively heavy mounting part 27 and an upper flange part 28, the parts 27 and 28 being joined by vertically extending ribs R which are integrally formed with the parts 27 and 28 and are spaced about the central vertical axis of the receptacle structure substantially equiangularly as appears better from Figs. 3, 4, and 7, it being noted that, in horizontal cross-section, the ribs R are V-shaped with their apexes directed inwardly toward the center and equiangularly spaced from each other (see Fig. 7). As better appears from Figs. 2 and 7, the inner portions of these ribs R extend upwardly from the upper face of the mounting part 27 and outer portions thereof extend downwardly along the sides of the mounting part 27, the adjacent parallel faces (Fig. 7) forming, with the side faces of the mounting part 27, vertically extending external grooves in which the lower end portions of the overlying contact and backing-up springs 25, 26 are received and thereby aligned in appropriate upwardly extending directions, being secured in position by screws 30 which are threaded into the mounting part 27 and which also and similarly secure and align in downwardly projecting direction the heavy sheet-metal connecting lugs 31, one for each contact spring and each provided at its lower end with suitable means such as a screw 32 for securing a conductor thereto.

The upper receptacle part 17 comprises a flange part 34 which mates in face-to-face contact with the flange part 28 (Fig. 2), a side wall 35, and a top wall 36, the five holes 18 being provided in the latter. The holes 18, and also the receptacle contact springs in the lower part 16, are spaced at sixty-degree intervals, thus leaving an interval considerably greater than sixty degrees, to the left as viewed in Fig. 1, for a purpose later described. Projecting downwardly from the top wall 36 of the upper part 17 (Fig. 2) and integrally formed therewith and with the side wall 35 are V-shaped ribs R^1 (see also Fig. 12), one to each side of a hole 18 and each forming in effect, when the upper part 17 is assembled to the lower part 16, upward extensions of the ribs R formed in the lower part 16, the upper ends of the contact springs 25, 26 projecting upwardly between them, excepting at the above-mentioned larger angular interval at the left, the bounding ribs R^1 of which have their adjacent parallel faces 37 spaced farther apart to provide a wider rectangular recess 38 in the upper part 17, for a purpose later described.

As indicated in Fig. 1, the side wall 35 of the upper part 17 may be circular and the flange parts 34 and 28 may be square, thus providing corners at which the upper and lower parts 16 and 17 may be secured together as by screws 40.

The parts are preferably so proportioned that the backing-up spring 26 can be straight, as shown in Fig. 2, while the contact spring 25, having the above-described V-shaped end 23, has a lower end portion 41 which rests against the side face of the mounting part 27, underneath the straight backing-up spring 26, whence it is bent inwardly so that its upper portions normally assume a position spaced inwardly from the upper end of the backing-up spring 26, thus bringing the upper portion of the V-bend 23 of each contact spring more or less in line with the center of the hole 18 which it underlies. At an intermediate point each contact spring 25 has a cam-shaped knee or V-bend 42. With the plug removed and hence with the upper ends of the contact springs 25 unrestrained by the plug contacts, the spring contacts 25 move radially inwardly under their own spring action. With the plug inserted, the camming action of the plug contacts 19 cam the springs radially outwardly to permit entry of the plug contacts, whence the inherent bias of the contact springs 25 enters their V-bends 23 into the V-groove 24 of the plug contacts, thus making good electrical connection with the latter and forming a releasable mechanical interlock.

The above-described radial inward movement of the several contact springs 25 in the receptacle, when the plug 20 is removed, is utilized to effect an activation of the signalling circuits the same as is effected by actuation of the push-button switch at the end of the multiple conductor cord 22 above mentioned, and this is effected by means of a conductive plate P, provided with portions that are in the path of radial inward movement of the contact springs 25, thus effecting electrical connection or short-circuiting between the above-mentioned four signalling circuits and the common or return line thereof, and thereby actuating the several signals. The plate P is preferably constructed to be held in assembled position and in proper relationship to the several contact springs 25 by the assemblage together of the upper and lower parts 16 and 17, and for this purpose I prefer to make use of the ribs R in the lower part 16 and the ribs R^1 in the upper part 17, appropriately shaping their adjacent ends to receive the plate P between them, and this arrangement I may vary according to the shape that it is desired to give to the conductive plate P.

For example, the plate may take the form indicated at 44 in Fig. 5, being in the form of a heavy sheet-metal stamping that is hexagonal in outline, excepting that in one edge face 44^a thereof it is cut away to provide a recess 44^b, the width of which substantially matches that of the recess 38 in the upper part 17 (see Fig. 12), leaving five edge contact faces F, one for each contact spring 25. As is better shown in Fig. 3, each of the ribs R of the lower part 16 is cut away or molded at its upper end, to a depth substantially equal to the thickness of the conductive plate 44, to provide seats S^1 which, moreover, are shaped with angular outer walls in which the apexes formed

by adjacent faces F—F' are received, thus preventing rotary movement of the plate 44 and also holding it against transverse shift and thus maintaining it coaxial with the receptacle construction. This relationship of the parts also insures that the recess 44b in the plate 44 is held aligned with the recess 38 in the upper part 17, the plate 44 overlying the ribs R, also stepped, that underlie the two ribs R1 that are to either side of the recess 38 in the upper part 17. When the latter is assembled to the lower part 16, the plate 44 of Figs. 3 and 5 is thus held in its seats in the lower ribs R by the ends of the overlying ribs R1 of the upper part 17.

The plate P of Fig. 2 may, however, also be made in the form of a disk 45 shown in Figs. 4 and 6, being cut away as at 45b to provide a recess like the recess 44b of the plate 44 of Figs. 3 and 5. In such case the seats S2 (Fig. 4) formed in the ribs R need not be angular at their outer walls but can be of the same curvature as the periphery of the plate 45, and to prevent rotary displacement of the slot or recess 45b, one of the ribs R is formed without a seat S2 and at a corresponding point in the disk-like plate 45 the latter has formed in it a V-shaped notch 46 in which is accommodated the upper end of the just-mentioned rib R that has no seat formed in it, as is shown in Fig. 9. The ribs R1 of the upper part 17, however, overlie those portions of the plate 45 that rest against the stepped or seated ribs R and hence the plate 45 is held against axial displacement.

If the depth of the seats formed in the ribs just matches the thickness of the plate, the latter is also held against axial movement and the parts may even be so proportioned as to effect some measure of clamping of the plate 44 or 45 when the screws 40 draw the upper and lower parts 16 and 17 into final assembled relation. It may, however, be desirable to allow some play or movement in a vertical or axial direction in order to achieve some greater measure of wiping action between the contact springs 25 and the conductive plate, and in such case the seats in the lower rib R may be made of greater depth, as is indicated in Fig. 8.

The plate P, whether it takes the form shown at 44 in Fig. 5 or at 45 in Fig. 6, is provided with a central hole 48 which is coaxial with a central bore 49 that extends through the mounting part 27 of the lower receptacle part 16 (see Fig. 2), the bore 49 forming a sliding bearing for the lower end of a round stem 50 that extends upwardly through the hole 48 in the conductive plate P, being thereby also guided for vertical movement. Intermediate of its ends the stem 50 carries a cam 51 which may be molded out of insulating material such as Bakelite, constructed to coact with the ends or V-bends 42 in the contact springs 25. About the lower end of the stem 50 is a coiled compression spring 52, the upper end of which abuts against the under side of the cam 51 and the lower portion of which extends into a counterbore or recess 49a that is coaxial with the bearing recess 49. Spring 52 normally holds the cam 51 and hence the stem 50 in uppermost position, that being determined by the conductive plate P which is held in between the two parts 16 and 17 and against the under side of which the upper face of the cam 51 abuts; in this position of the stem 50 and cam 51, the upper end of the stem 50 projects a substantial amount beyond the top wall 36 of the upper part 17 so that it may be manually actuated downwardly against the action of the spring 52.

With the cam 51 in uppermost position, the plane of its under face is somewhat above the apex of the V-bends 42 of the contact springs 25 so that the latter are free, under their spring action, to move radially inwardly as above described to contact the plate P when the plug is removed, thus setting all of the signals. The side face of the cam 51 has a lower band-like cylindrical part 51a which is of substantially the same radius as the circle upon which the apexes of the ribs R1 lie, so that the part 51a and the ribs R may coact and guide the cam 51 in its movements. Above the part 51a the cam 51 has a frusto-conical cam surface 51b, the two cam surfaces coacting with the V-bends 42 of the contact springs, both when the stem 50 is depressed and when it is released for upward movement, as is later described.

When the stem 50 is depressed, the lower edge of the cam part 51a engages the upper cam face of the V-bends 42, camming the latter and hence the contact springs 25 radially outwardly to disengage them from the plate P, that action being continued when the frusto-conical cam face 51b engages the knees 42, completing the radial outward movement of the five contact springs 25 and, by the tension thus placed in the springs 25 and now also in the backing-up spring 26, causing the radial inward pressure exerted by the knees 42 on the cam face 51b to be resolved into a vertical component tending to force the cam 51 and the stem 50 upwardly, aided by the now additionally compressed spring 52, and, unless the cam 51 is held in its position displaced downwardly from the fixed plate P, it and the stem 50 would snap upwardly and restore to a position as limited by the fixed plate P.

However, by the time the above-described downward movement of the cam 51 is completed, a stop member 53 rides into the path of upward movement of the cam 51 and prevents it from partaking of such upward movement. Cam 51 is thus held in downward position and contact springs 25 prevented from engaging the plate P.

The stop member 53 is in the form of a downwardly-projecting stud-like part of a horizontal lever 54 which, as is better shown in Fig. 11, is provided with spaced ears 55 receivable between spaced ears 56 formed at the upper end of a flat post 57, a pin 58 passing through holes in these ears and thus forming a pivotal connection for the lever 54 and the stud 53. About the pin 58 is a coiled spring 60, the respective ends of which abut against the post 57 and the stop stud 53, acting upon the latter to tend to swing it in counter-clockwise direction as viewed in Fig. 2. The greater width (vertical dimension as seen in Fig. 11) of these parts is accommodated in the wider recess 38 in the upper part 17 above described, the flat post 57 extending downwardly in the narrower space between two of the ribs R of the lower part 16 where it is secured by screws 61 to the mounting part 27, much in the same manner as the contact springs 25, 26 are secured by the screws 30 as above described.

The stop arm or stud 53, which may be of sheet metal and formed up out of the sheet metal of the lever 54, extends downwardly through the plane of the conductive plate P by way of the cut-out or recess 44b in Fig. 5 or 45b in Fig. 6, and in the position of the parts as shown in Fig. 2, it is pressed by the spring 60 against a vertical flat face 51c (see also Fig. 10) formed at a side of the cam 51 but positioned at a greater radius

than is the bottom of the recess in the conductive plate, so that upon downward movement of the cam 51 to a sufficient extent (see Fig. 2), the stud 53 can ride in counter-clockwise direction over the upper face of the cam 51 to an extent limited by the left-hand edge face of the plate P formed in the bottom of the recess 44b of Fig. 5 or 45b of Fig. 6. The amount of inward or counter-clockwise swing of the stud 53 need not be more than the thickness of the stud 53 itself, so as to require but a small clockwise swing of the stud 53 to move it out of cam-stopping position.

The stop member 53 is of a length such that it snaps into stopping position when the knees or V-bends 42 of the springs 25 are engaged by the frusto-conical cam face 51b of the cam 51, and the parts are dependably held in this position by the upward stress exerted by the knees 42 upon the cam 51 and also by that of the spring 52.

The lever 54 (Figs. 2 and 11) is preferably shaped to provide a hole 62 materially larger than the upper part of stem 50 so as not to bind with the latter in course of any tilting movement of the lever 54 itself, and thus it provides an annular or ring-shaped part 63 that surrounds the stem 50 underneath and spaced downwardly from the top wall 36 of the upper part 17, being engaged by the convex annular under-face 64 of a collar 65 that extends relatively loosely about the upper end of the stem 50 and is slidably guided in a hole 66 in the top wall 36, a peripheral flange 65a of the collar 65 being engageable with the under side of the top wall 36 to limit the extent to which the collar 65 projects upwardly beyond the top wall 36. The angle between the lever 54 and the stop 53 is such that, with the stop part 53 engaging the flat side face 51c of the cam 51, the lever 54, through its annular part 63, holds the collar 65 in upward position with some leeway for slight additional upward movement when the parts swing a bit more in counter-clockwise direction as the stop part 53 rides inwardly onto the upper face of the cam 51.

With the cam 51 held by the stop 53, in desired position, in response to downward actuation of the stem 50 manually to inactivate the signals that are set when the plug is removed from the receptacle, the parts remain in these positions and the signals remain unactivated until the plug 20 is reinserted or is reassembled to the receptacle 15. As shown in Fig. 2, the plug 20, made or molded out of any insulating material like Bakelite, has at its center a stepped or counter-bored recess 68 of a depth and diameter adequately to accommodate the stem 50 when the latter is in its uppermost position, the step or shoulder in the recess 68 taking over the outwardly-projecting collar 65 and engaging it during the latter portion of the movement necessary to complete the assemblage of the plug 20 to the receptacle 15 and hence forcing it downwardly, thereby depressing the lever 54 and swinging the stop part 53 laterally out of engagement with the top surface of the cam 51, whence the upward reaction of the knees 42 on the cam surface 51b, aided by the spring 52, in effect snaps the cam 51 upwardly against the plate P, the upper end of stem 50 being accommodated in the depth of the recess 68 of the plug 20 and the V-bends 23 of the contact springs 25 interengaging electrically and mechanically with the plug contacts 19 which thus hold them out of engagement with the short-circuiting plate P and supersede the action of the cam 51 in so holding them out of engagement with the plate P. The reinsertion of the plug 20 is thus achieved without activating the signalling circuits. With the restoration of the cam 51 and stem 50 to uppermost position, the contact springs 25 may again engage the plate P in the event of removal of the plug 20 to change over the signalling circuits to activated condition, a condition which can be undone by now manually depressing the stem 50, as above described, to bring the stop member 53 again into coaction with the cam 51.

As is better shown in Fig. 10, I prefer to form in the cam 51 vertically-extending V-slots 70, one for each of the V-shaped ribs R in the lower part 16, the coaction between these parts not only aiding and guiding the cam 51 in its vertical movements, but also in preventing it from rotating so that the flat side face 51c of the cam is always presented for coaction with the stop member 53. Should the short-circuiting plate be mounted to have some leeway of vertical movement, as was above described in connection with Fig. 8, such movement is preferably very slight, being insufficient to change the relationship between the plate and the contact springs 25 but being sufficient to permit more rubbing movement to take place between the two than occurs under the bias of the springs 25 themselves, thus to aid in keeping the contacting surfaces clean and bright and hence of low resistance.

It will thus be seen that there has been provided in this invention a plug and receptacle construction in which the several objects above noted, together with many thoroughly practical advantages, are successfully achieved. It will be seen that the structure is compact and is of thoroughly dependable action and, moreover, is capable of speed and facile assembly, many of the parts, when assembled in appropriate sequence, being brought into the entity for proper structural and functional coaction merely by the securing together of the upper and lower parts of the receptacle itself.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A plug and receptacle construction comprising a receptacle body of insulating material and a plug body of insulating material, the plug body having a plurality of plug contacts and the receptacle body having a plurality of recesses both grouped about the common axis of the two bodies for the reception of the plug contacts into the receptacle recesses, said receptacle body comprising two parts with means securing them together along substantially a transverse section of the receptacle body, a conductive plate within said receptacle body and extending transversely thereof and received between and held in position by said two body parts, said receptacle body having a plurality of contact springs respectively exposed in said recesses for engagement respectively by said plug contacts and biased inwardly for engagement with said conductive plate, said plug contacts holding said spring contacts out of engagement with said plate, cam means having means mounting it for movement within said receptacle body and along the axis thereof and adapted upon actuation in one direction to bias said spring contacts in a direction away from

said conductive plate and upon actuation in reverse direction to permit movement of the spring contacts in a direction toward said conductive plate, means projecting from said receptacle body and along the axis thereof and toward said plug body for actuating said cam means in said first direction, said plug body having recess means for accommodating said projecting means, means for holding said cam means upon actuation in said first direction, and movable means projecting from said receptacle body and engageable by said plug body on assembly of the latter to the receptacle body for releasing said holding means.

2. A plug and receptacle construction comprising a receptacle body of insulating material and a plug body of insulating material, the plug body having a plurality of plug contacts and the receptacle body having a plurality of recesses both grouped about the common axis of the two bodies for the reception of the plug contacts into the receptacle recesses, said receptacle body comprising two parts with means securing them together along substantially a transverse section of the receptacle body, a conductive plate within said receptacle body and extending transversely thereof and received between and held in position by said two body parts, said receptacle body having a plurality of contact springs respectively exposed in said recesses for engagement respectively by said plug contacts and biased inwardly for engagement with said conductive plate, said plug contacts holding said spring contacts out of engagement with said plate, spring-opposed cam means within said receptacle body having means mounting it for movement in opposition to its spring to cam said spring contacts away from said conductive plate, means for holding said cam means in opposition to its spring in a position to hold said spring contacts away from said conductive plate, and movable means projecting from said receptacle body and movable by said plug body on assembly of the latter to the receptacle body for releasing said holding means.

3. A plug and receptacle construction comprising a receptacle body of insulating material and a plug body of insulating material, the plug body having a plurality of plug contacts and the receptacle body having a plurality of recesses both grouped about the common axis of the two bodies for the reception of the plug contacts into the receptacle recesses, said receptacle body comprising two parts with means securing them together along substantially a transverse section of the receptacle body, a conductive plate within said receptacle body and extending transversely thereof and received between and held in position by said two body parts, said receptacle body having a plurality of contact springs respectively exposed in said recesses for engagement respectively by said plug contacts and biased inwardly for engagement with said conductive plate, said plug contacts holding said spring contacts out of engagement with said plate, a member positioned at the axis of said receptacle body and projecting therefrom toward said plug body and having means responsive to inward axial movement thereof to disengage said spring contacts from said conductive plate, said plug body having a recess therein for accommodating said member when in projected position, and means responsive to inward movement of said member for holding it in inward position to thereby hold said spring contacts disengaged from said conductive plate and including a coaxial member concentrically arranged about said first member and projectible toward said plug body in response to actuation of said holding means whereby said concentric member is engageable by said plug body on assembly of the latter to the receptacle body to move it inwardly of the latter and actuate said holding means into releasing position.

4. A plug and receptacle construction comprising a receptacle body of insulating material and a plug body of insulating material, the plug body having a plurality of plug contacts and a central recessed portion and the receptacle body having a plurality of recesses both grouped about the common axis of the two bodies for the reception of the plug contacts into the receptacle recesses, said receptacle body comprising two parts with means securing them together along substantially a transverse section of the receptacle body, a conductive plate within said receptacle body and extending transversely thereof and received between and held in position by said two body parts, said receptacle body having a plurality of contact springs respectively exposed in said recesses for engagement respectively by said plug contacts and biased inwardly for engagement with said conductive plate, said plug contacts holding said spring contacts out of engagement with said plate, movable means extending axially of the receptacle body and having a portion projecting from said receptacle body and adapted to be received in and shielded by the said recess in said plug body, and coacting upon movement in one direction to disengage said spring contacts from said conductive plate holding means movable into the return path of said movable means in response to said movement to hold said movable means against retrograde movement, spring means adapted to give said movable means retrograde movement when released from said holding means, and means responsive to movement on assembly of said plug body to said receptacle body for actuating said holding means to release said movable means.

5. A plug and receptacle construction as claimed in claim 4 in which said spring means comprises a separate spring contained within, and disposed axially of the receptacle body, that is stressed in response to movement of said movable means in said one direction.

6. A plug and receptacle construction as claimed in claim 4 in which portions of at least one of said two body parts, at said transverse section, are recessed to form a seat for said conductive plate, juxtaposed surfaces on said two parts holding said conductive plate against material movement.

7. A plug and receptacle construction as claimed in claim 4 provided with recess means of greater depth than the thickness of said conductive plate for receiving the latter, juxtaposed surface portions of said two parts overlying the respective sides of said plate to form said recess means whereby said conductive plate can partake of a small movement to rub said contact springs during its engagement therewith.

8. A plug and receptacle construction as claimed in claim 4 in which said recesses are formed by the spaces between substantially mating rib elements in both parts of said receptacle body, at least certain of said rib elements having seats at said transverse section for receiving and holding said conductive plate.

9. A plug and receptacle construction as claimed in claim 4 in which said recesses are formed by the spaces between substantially mating rib elements in both parts of said receptacle

body, at least certain of said rib elements having seats at said transverse section for receiving and holding said conductive plate, the spring disengaging means of said movable means comprising cam means positioned below said conductive plate.

10. A plug and receptacle construction as claimed in claim 4 in which said two parts of the receptacle body have mating rib elements the spaces between which form at their upper ends certain of said recesses for receiving said plug contacts, said spring contacts extending upwardly within said certain spaces and into the upper ends thereof, and means for mounting said contacts at their lower ends to said receptacle body, said holding means being mounted in one of said spaces.

11. A plug and receptacle construction as claimed in claim 4 in which the part of said receptacle body remote from said plug body comprises a mounting part having upstanding therefrom a plurality of rib elements to form vertically-extending spaces therebetween, at least one for each of said plug-contact-receiving recesses, said spaces having received therein said contact springs, and means securing the latter to said mounting part.

12. A plug and receptacle construction comprising a receptacle body and a plug body, the plug body having a plurality of plug contacts and the receptacle body comprising two parts with means securing them together along substantially a transverse section of the receptacle body, the part adjacent the plug body having recesses therein for respectively receiving said plug contacts, the other part of said receptacle body comprising a mounting part and a plurality of upstanding spaced rib elements grouped about said common axis and providing a plurality of spaces each terminating in juxtaposition to one of said recesses, a plurality of contact springs received in said spaces with means securing their lower ends to said mounting part for coaction at their upper ends respectively with said plug contacts, a relatively fixed conductive means carried by said receptacle body and engageable by said spring contacts upon disengagement of the latter by said plug contacts, and means extending and movable along the axis of said two receptacle body parts and projecting from one of them toward said plug body, said last-mentioned means having means for actuating said spring contacts out of engagement with said conductive means.

13. A plug and receptacle construction comprising a receptacle body and a plug body, the plug body having a plurality of plug contacts and the receptacle body comprising two parts with means securing them together along substantially a transverse section of the receptacle body, the part adjacent the plug body having recesses therein for respectively receiving said plug contacts, the other part of said receptacle body comprising a mounting part and a plurality of upstanding spaced rib elements grouped about said common axis and providing a plurality of spaces each terminating in juxtaposition to one of said recesses, a plurality of contact springs received in said spaces with means securing their lower ends to said mounting part for coaction at their upper ends respectively with said plug contacts, a relatively fixed conductive means carried by said receptacle body and engageable by said spring contacts upon disengagement of the latter by said plug contacts, said receptacle body part that is adjacent the plug body having a coaxial aperture, means movable axially within said receptacle body for disengaging said contact springs from said conductive means, and means projecting through said aperture and engageable and movable by said plug body upon assembly of the latter to the receptacle body for effecting movement of said movable means in a direction to permit said spring contacts to move in directions to engage said conductive means.

14. A plug and receptacle construction comprising a receptacle body of insulating material and a plug body of insulating material, the plug body having a plurality of plug contacts and the receptacle body having a plurality of recesses both grouped about the common axis of the two bodies for the reception of the plug contacts into the receptacle recesses, said receptacle body comprising two parts with means securing them together along substantially a transverse section of the receptacle body, a conductive plate within said receptacle body and extending transversely thereof and received between and held in position by said two body parts, said receptacle body having a plurality of contact springs respectively exposed in said recesses for engagement respectively by said plug contacts and biased inwardly for engagement with said conductive plate, said plug contacts holding said spring contacts out of engagement with said plate, and movable means coacting upon movement in one direction to disengage said spring contacts from said conductive plate, one or more of said spring contacts comprising a cam-like portion operative under the spring bias of said spring contacts to cam said movable means in retrograde direction.

15. A plug and receptacle construction comprising, a receptacle body, and a plug body, the receptacle body having a plurality of recesses therein and said plug body having a plurality of contacts adapted to be inserted in said recesses respectively, a circuit closing plate disposed substantially at right angles to the axis of said receptacle body, said receptacle body having a plurality of contact springs disposed for engagement respectively by said plug contacts when they are inserted in said recesses, and biased inwardly for engagement with said circuit closing plate when said plug contacts are not inserted in said recesses, said plug contacts when inserted holding said spring contacts out of engagement with said plate, a circuit opening plunger assembly disposed axially of said receptacle body and plug which, when moved in one direction, will move said spring contacts away from said plate, and means resisting such movement for returning said circuit opening assembly to its original inoperative position.

16. A plug and receptacle construction comprising, a receptacle body, and a plug body, the receptacle body having a plurality of recesses therein and said plug body having a plurality of contacts adapted to be inserted in said recesses respectively, a circuit closing plate disposed substantially at right angles to the axis of said receptacle body, said receptacle body having a plurality of contact springs disposed for engagement respectively by said plug contacts when they are inserted in said recesses, and biased inwardly for engagement with said circuit closing plate when said plug contacts are not inserted in said recesses, said plug contacts when inserted holding said spring contacts out of engagement with said plate, a circuit opening plunger assembly, disposed axially of said receptacle body and plug, which, when moved in one direction, will move said spring contacts away from said plate, and

means resisting such movement for returning said circuit opening assembly to its original inoperative position, means for locking said assembly in circuit opening position, and means actuated by engagement of the plug body in said receptacle body for releasing said assembly locking means.

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