

- [54] RECESSIBLE ELECTRIC FLOOR OR THE LIKE OUTLET ASSEMBLY**

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- [22] Filed: **June 30, 1972**

- [21] Appl. No.: 268,065

- [52] U.S. Cl..... 339/34, 174/48, 220/3.7,
339/91 R, 339/94 R

- [51] **Int. Cl.**..... H01r 13/46

- [58] **Field of Search**..... 339/34, 36, 42, 43, 45, 75,
339/91, 119, 120, 122, 123, 124, 125, 126,
153, 154, 156.7, 164, 191; 220/3.2-3.7;
174/48, 57; 248/361; 292/175

- [56]
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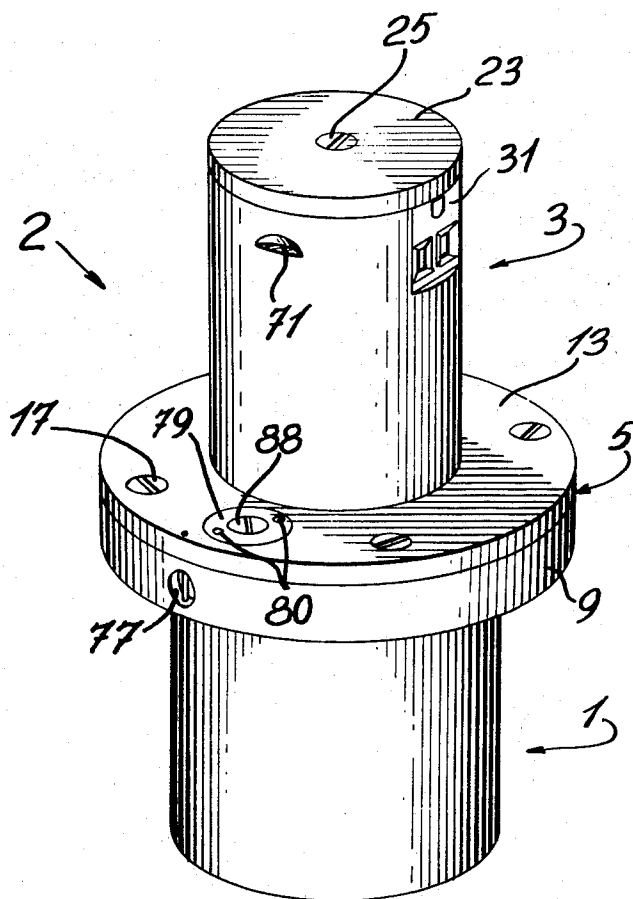
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[57] **ABSTRACT**

A retractable electric floor outlet assembly formed of telescopic inner and outer members, the inner member being movable between an operative extended position to an inoperative retracted position; the members terminating at one end with flat transverse surfaces becoming flush with one another when the members are in inoperative position. A lock is provided to hold the inner member inside the outer one in inoperative position of the assembly. The lock is releasable to allow the inner member to extend out of the outer member under the bias of a spring mounted therebetween. A circuit breaker is formed between the two members to make an electrical junction when the members are in operative position and to brake it when the members are in inoperative position. O-ring seals on the members prevent entry of water in the outlet member.

14 Claims, 11 Drawing Figures



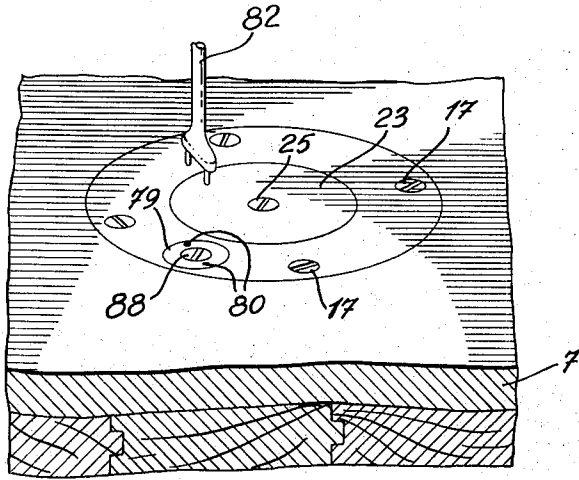


Fig. 1

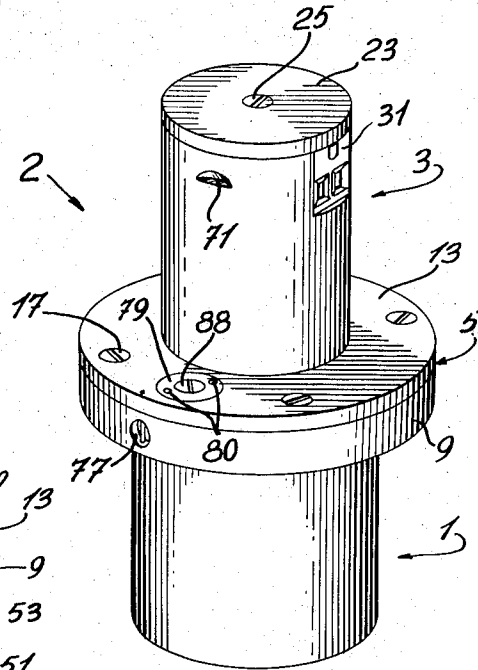


Fig. 2

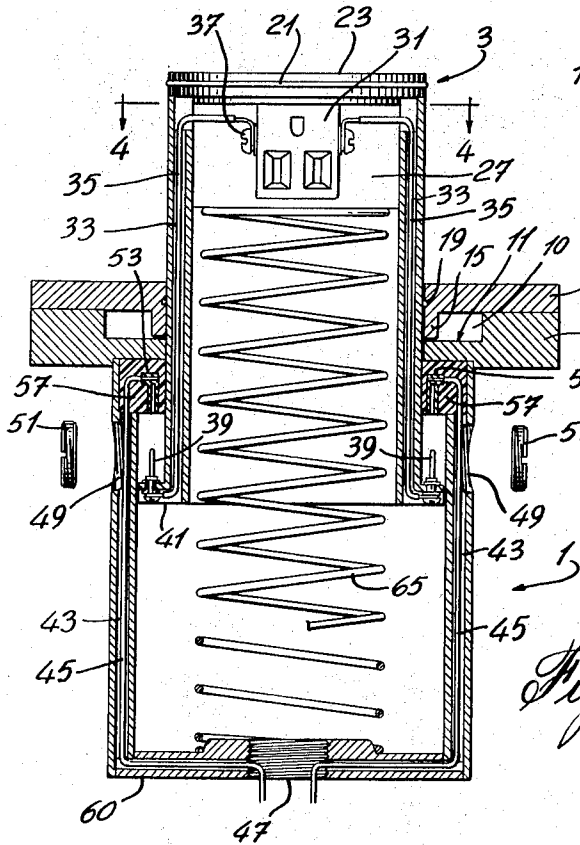
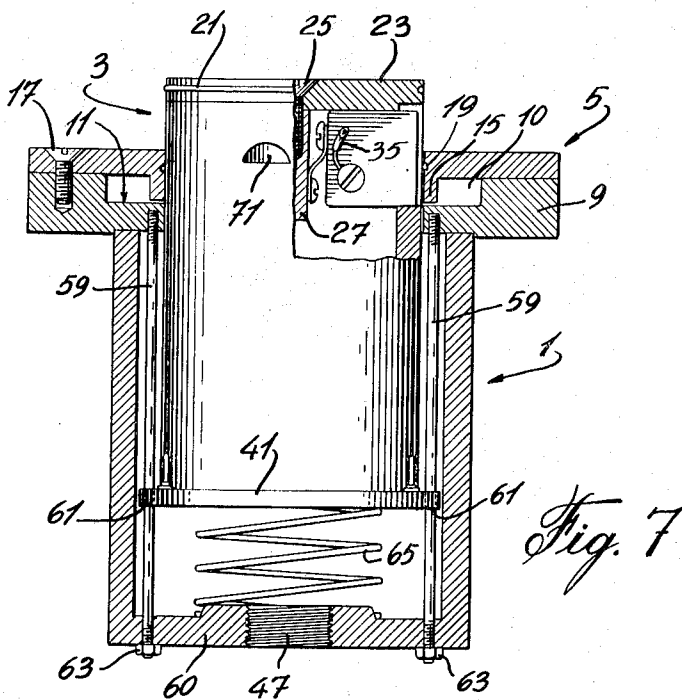
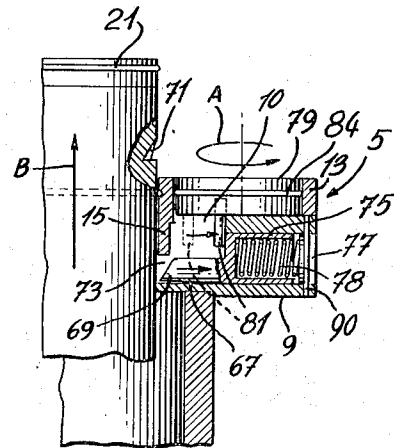
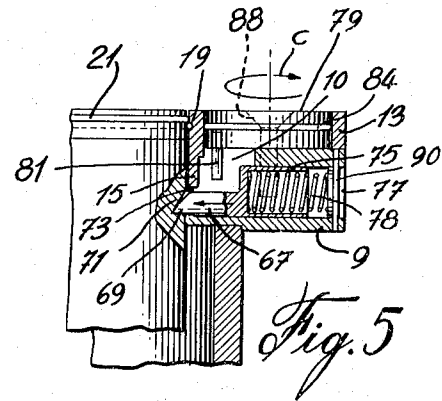
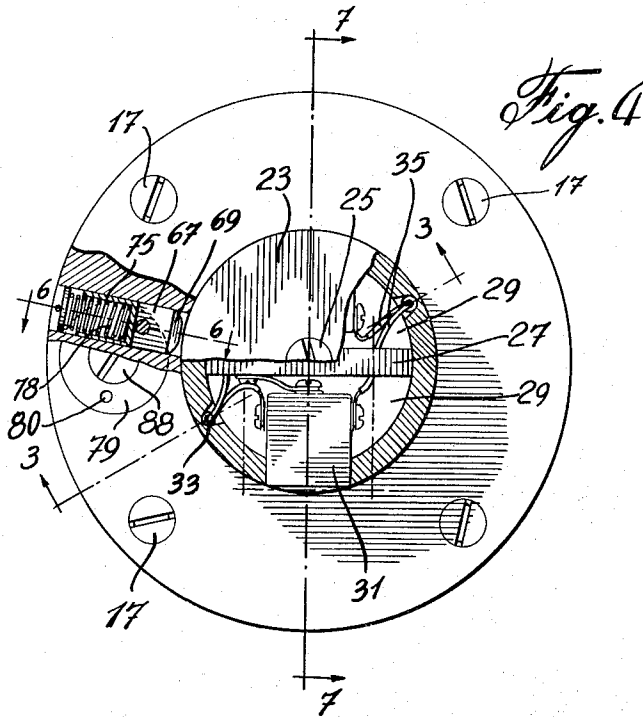
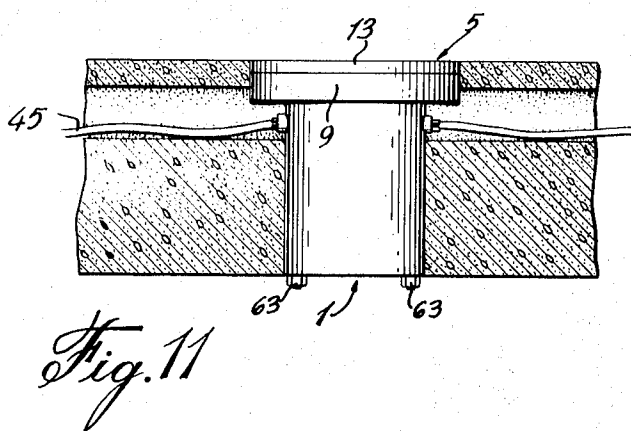
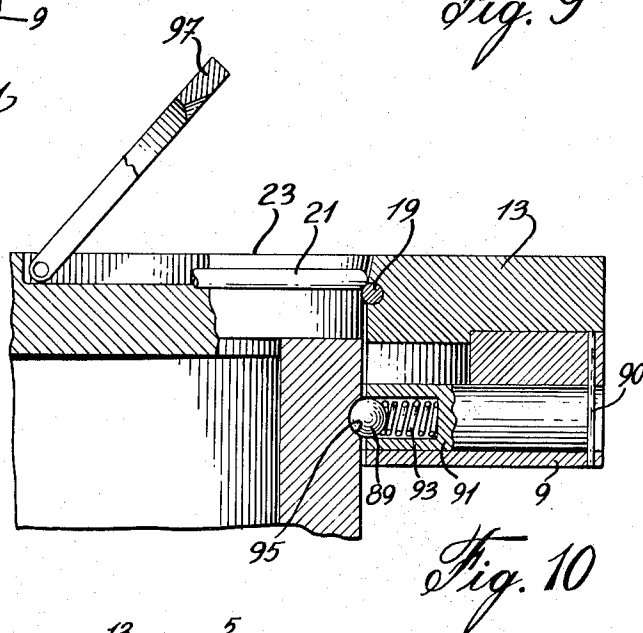
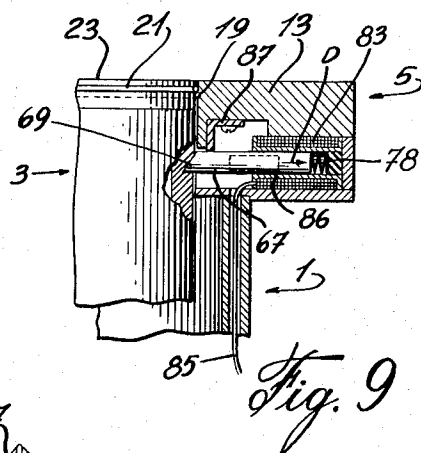
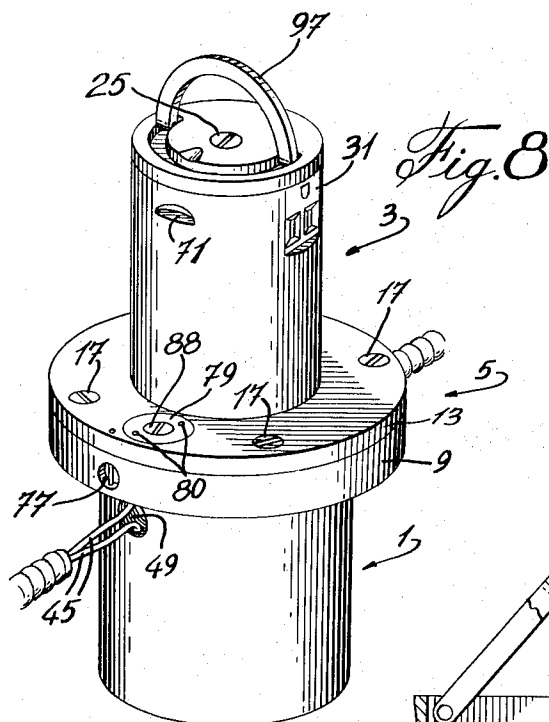


Fig. 3





RECESSIBLE ELECTRIC FLOOR OR THE LIKE OUTLET ASSEMBLY

The present invention relates to a retractable or recessible electric outlet assembly to be mounted on floor or the like, with the top face thereof flush with the surface of the floor when said outlet is not used.

Assemblies of this type are not presently available on the market. The floor electric outlets currently available to-day are either of the fixed pedestal type, protruding approximately 6 inches from the floor, or the floor-flush type which is counter-sunk in the floor and which necessitates a screwcap to make sure that the horizontal electric outlet is sealed against dust and water.

Considering today's trend to have office landscape planning and large floor areas in school classrooms, offices, show-rooms, congress halls, it is evident that the elimination of dividing walls, which were bearing the electrical outlets, creates the need for floor installed electrical power sources.

The known electrical pedestal that protrudes above the floor, creates a problem if the furniture is to be removed from the room or if equipment requiring electrical power has to be in the room or is no longer to be used. As to the floor-flush outlets, they can only be used by unscrewing the top plate, storing it and re-installing it after use to insure dust and water sealing.

It will easily be gathered that such devices create quite a nuisance when the furniture and equipment requiring electrical power is to be displaced several times a day.

The use of electrical equipment on wheels, such as typewriters, adding machines, calculators, is often needed for very short periods only. And while a standard pedestal outlet would be quite cumbersome, the floor-flush outlet would need tooling and quite an amount of manual work, to have access to the electrical outlet for a few minutes only.

Accordingly one of the objects of the present invention is to provide an electrical outlet with have both the sturdiness and availability of the pedestal outlet, in use, and the neatness and safety of the floor-flush outlet when the screw cap is in closed position.

Preferably the invention provides for a very simple mechanism to open the electric outlet and make it ready to use above the floor, when needed, and just as easily snap it back into concealed position while providing a water tight joint and a pleasant appearance. The usefulness of the outlet of this invention can easily be appreciated when floors have to be washed as then all the outlets can be pushed and locked automatically in place in a water tight and de-energized position. After cleaning is over, a simple turn of a key snaps all outlets back into service position again, ready for use.

In general, this type of fixture would allow polyvalent use of large areas that could very well be used alternatively as work space or dance halls.

Also, retractable outlet assemblies of this invention can be used in conjunction with known floor ducts, be installed in a modular manner throughout schools, office buildings, convention halls, showrooms, etc., provide readily available safer power outlets at instant notice, and can require a minimum of labor to have them just as quickly out of the way.

Because of its simple construction, an outlet according to the invention and made of thermoplastics or light weight materials, can be very inexpensive and installed in large quantities during building construction. For existing buildings, such as renovated office building and schools, outlets according to the invention can be readily installed in concrete or wood floors, merely by drilling holes for this insertion. As this fixture is entirely installed from the top, the installation and service problems are as simple as with normal wall plugs.

More specifically, the electric outlet assembly of the invention has telescopic inner and outer members and an electric circuit breaking means including cooperating parts on the members, the parts being operatively mated in operative position to make an electric junction and being separated in inoperative position to thus brake the junction. The assembly further provides resilient means between the members to force the inner member out of the outer member and into operative position when the locking means, provided to hold the members in inoperative position, are released. Finally, the assembly of my invention comprises sealing means on at least one of the telescopic members and at one end thereof to prevent entry of wash liquid into the outer member.

Other features and advantages of the invention will become apparent from the following description of a preferred embodiment of the invention having reference to the appended drawings wherein:

FIG. 1 is a perspective view of the outlet assembly of the invention as shown mounted on a floor with the top surface flush with the surface of the floor and in retracted position;

FIG. 2 is a perspective view of the assembly of the invention in extended position and removed from the floor;

FIG. 3 is an axial cross-sectional view taken along line 3—3 of FIG. 4;

FIG. 4 is a top plan view of the assembly with portions broken away to show inside features;

FIG. 5 is a partial cross-sectional view taken at the top right corner of the outlet assembly and along line 6—6 of FIG. 4, the inner member being shown in locked inoperative position;

FIG. 6 is a view similar to that of FIG. 5 but showing the inner member being pulled out of the outer member;

FIG. 7 is a side elevational view taken along line 7—7 of FIG. 4, the inner member being shown in elevation with portion being broken away;

FIG. 8 is a perspective view of the assembly with certain ancillary features different from those shown in the perspective view of FIG. 2;

FIG. 9 is a cross-sectional view similar to that of FIG. 5 but showing the locking means according to a further embodiment;

FIG. 10 is a view similar to that of FIG. 9, on a larger scale, showing still another embodiment of locking means and a pulling handle for lifting the inner member out of the outer member;

FIG. 11 is a cross-sectional view of a floor in which an outlet assembly in accordance with the embodiment of FIG. 8 is shown mounted.

Referring now particularly to FIGS. 1, 2 and 3, a retractable electric floor assembly 2 is shown which comprises two telescopic parts, a hollow lower part or outer member 1, preferably cylindrical, and a hollow upper

part or inner member 3, also preferably cylindrical, the latter being slidably received in the former.

The outer cylindrical member 1 is provided with an annular flange 5 and is adapted to be mounted in a floor 7 as illustrated in FIGS. 1 and 11. It is to be understood, however, that the outlet assembly of the invention may also be mounted on any other partitioning structure such as a wall or even a ceiling.

The flange 5 is made up of two sections, a bottom one 9 removably connected to the top of the outer member 1 and a top one 13 removably mounted on the bottom section 9 by means of screws 17.

The flange section 13 is provided at its center with a downwardly projecting circular rim 15 which surrounds the inner member 3 when the latter is placed inside the outer member 1. The rim 15, when section 13 is secured to section 9, projects inside an annular groove 11 having an L shape in cross-section and provided at the center of the section 9. The inner diameter of the groove 11 is greater than that of the rim 15 whereby to define an annular space 10 the function of which is explained hereinbelow.

The inner member 3 is provided with a cover 23 removably secured by means of a screw or screws 25 fastened to a diametral plate 27 (FIGS. 3, 4 and 7) dividing the upper part of the inner member 3 into two half portions 29 (FIG. 4).

Inside each portion 29 and on the side wall of the cylindrical inner member 3, there is provided a standard socket 31 having the usual three apertures or slots of which one is for use for the ground connection and the others for the electric junction, when the inner member 3 is in extended operative position. Sockets 31 may be secured in position by any convenient means.

Plate 27, apart from providing a structure for the fastening of the screw 25, may also be used for the connection of the ground wires as perhaps best seen in FIG. 7.

The cover 23 has a fluid-tight O-ring seal 21 or the like gasket which, when the upper cylinder or inner member 3 is in its retracted inoperative position, makes contact with a second gasket or O-ring 19 provided on the flange section 13 thus providing fluid-tight sealing to prevent water from leaking between the members 1 and 3 (see FIG. 5). When the inner member 3 is in extended operative position, it is the sealing gasket 19 alone that provides the fluid-tightness of the assembly.

The wall of the inner member 3 may be provided with longitudinal channels 33 (FIG. 3) for receiving a first series of electrical wires 35, one end of each of which being secured by means of a screw 37 to a socket 31, while the other end is connected to a junction pin 39 provided on the lower flange 41 of the member 3 in a manner to be electrically insulated from member 3.

Likewise, the outer member 1 may be formed with channels or ducts 43 for the reception of a second series of electrical wires 45 introduced through an aperture 47 of the base 60 or through two apertures 49 of the cylindrical wall of the member 1.

The ends of the wires 45 inside the member 1 are connected to junction sleeves 53 embedded in a rubber or plastic ring 57 mounted inwardly of the member 1 at the upper end thereof so as to be electrically insulated from member 1.

The junction pins 39 are meant to be fitted with force into the junction sleeves 53 when the inner member 3

is raised to operative position at which time the sockets 31 become electrically conductive. Upon lowering of the member 3, the pins 39 move out of the sleeves 53 so that the sockets 31 are no longer conductive. It will thus be realized that the sleeves 53 and the pins are two cooperating parts of a circuit breaker that mate in operative position. This feature provides safety against short circuits by water when the outlet assembly is not in use, that is, when the inner member 3 is retracted in the outer member 1. It is indeed to be noted that sockets 31 remain de-energized or non-conductive during all the time that the inner member 3 is in its recessed position.

The sockets 31 are energized only when the inner member 3 is in its completely extended position.

Apertures 47 and 49 may be closed by screw plugs 51 when not in use. Thus, in certain instances, it may be more advantageous to use the lower aperture 47 such as in FIG. 3 while in other cases the lateral apertures 49 may have to be used, such as in the installation of FIG. 11.

In the embodiment shown, the leads 35 and 45 are inserted in the two ducts 33 and 43 but it should be understood that each wire may be inserted inside a separate duct. In the present example, there are therefore only need for two junction pins 39 and two junction sleeves 53.

The lower annular flange 41 of the upper member 1 has a diameter greater than that of the inner diameter of the sleeve 57 whereby the upper member 1 is held captive in the outer member 3 when the flange 5 is secured on top of the member 1.

As shown in FIG. 7, two guide bars 59 extend longitudinally inside the member 1, being threadedly connected to the flange section 9, at one of their ends, while the other ends pass through holes formed across the base 60 as well as through holes 61 across the flange 41. The lower ends of the bars 59 are secured to the base 60 by means of nuts 63. These guide bars serve to interconnect the flange section 9 and the top of the member 1 and also to provide guide means for the telescoping movement of the members, thus preventing any wobbling during extraction or retraction of the member 1.

The inner member 1 is biased toward operative position by resilient means such as spring 65 of which one end abuts against the plate 27 while the other end rests on the base 60. As soon as the locking means, to be described hereinbelow, are released, the spring 65 automatically urges the inner member 3 upwardly into operative position.

The said locking means, according to the embodiment shown in FIGS. 5 and 6, comprises a finger element 67 having a bevelled end 69 adapted to be pushed into a notch 71, formed at the upper end of the member 3, when the latter is in retracted inoperative position (FIG. 5).

The active portion of the finger element 67 is located in the annular space 10 and is made to move radially therein, the rim 15 of the flange 13 being provided for that purpose with an opening 73 to allow the said finger element to reach the notch 71.

Element 67 is an integral part of a small hollow case 75 open at one end and radially and preferably horizontally disposed in a radial bore of the flange section 9, the said bore having an opening 77 for the insertion of a compression spring 78 adapted to bias the case 75

and the finger 67 toward the notch 71. As shown, one end of the spring 78 lies against the inner end of the case 75 while the other end rests against a pin 90 extending across the bore 77 and secured to the flange section 9.

Thus, the locking means is formed of a finger element 67 insertable into a notch 71 and having a case 75 and a spring 78 inserted in the case.

Release of the above-mentioned locking means from their retaining position is obtained by an unlocking means comprising a disc element 79 (FIGS. 4 and 5) received in a vertical bore of the flange section 13, the disc 79 being mounted for rotation about an axis offset from the bore of the case 75 and being secured by a screw 88 driven into the flange section 9. The disc element 79 also has a stud 81 projecting down into the annular space 10 and positioned to be applied against the case 75 during counterclockwise rotation, as clearly deductible from FIGS. 4, 5 and 6.

Let us now assume that the inner member 3 is in its inoperative position with the finger element 67 in locking position in notch 71 and it is desired to bring member 3 to operative position. Use is then made of a pronged key 82 (FIG. 1) which is inserted into key-holes 80 formed in the disc 79 and the latter rotated in counterclockwise direction of arrow A, FIG. 6, bringing the stud 81 to compress the spring 78 and move the finger element 67 out of the notch 69 thus freeing the member 3 which can then move upward under the bias of the spring 65. The pins 39 are then pressed into the sleeves 53 and the electric junction is made.

When the socket-provided member 3 is no longer required, it is only necessary to push it down into the outer member 1 until the finger member 67 again moves into the notch 71 under the bias of the spring 78.

A sealing O-ring 84 on the disc 79 (FIGS. 5 and 6) prevents water from seeping between the disc and its bore.

FIG. 9 illustrates a second alternative in the construction of the locking means. In this embodiment, the case 75 and the disc 79 are replaced by a solenoid 83 mounted to surround the end of the finger element 67 at the end opposite the bevelled end 69, the finger element 67 being then only a mere rod or bar. The solenoid 83 is connected by a wire connection 85 to an electric circuit including a remote control switch (not shown) which, when actuated, results in the application of an axial magnetic field creating a force D capable of withdrawing the finger element 67 from the notch 71. In this embodiment, the finger element 67 must obviously be made of electromagnetic material.

An angular member 87 may be provided to guide finger element 67 in its horizontal displacements.

When the solenoid 83 is de-energized, a spring 78 biases the finger element 67 back into contact with the member 3 and eventually into the notch 71.

FIG. 10 illustrates a locking means in accordance with a third alternative.

In this instance, there is provided a ball element 89 housed into a hollow case 91 radially projecting from the flange section 9 in the direction of the member 3. A spring 93 within the hollow case 91 pushes the ball 89 outwardly in latching engagement in the hemispherical groove 95 formed on the upper part of the member 3. When the ball element 89 is lodged in the groove 95, it locks the member 3 in inoperative position in the

same manner as described above for the finger element 67.

When it is desired to release the member 3, it is only necessary to pull on an arcuate handle 97 pivotable upwardly from an arcuate groove formed on the cover 23 of the outer member 3. With a slight upward pressure, the ball 89 can be unlatched and moved inside the hollow case 91 against the action of the spring 93.

The aforementioned groove 11 formed around the central aperture of the flange section 9 need not be as large as to leave an annular free space 10 adjacent the rim 15, this construction being only proposed because it appears simpler than providing a radial notch in the flange section 9 for the reception of the locking means.

Finally, it is obvious that the members 1 and 3 could be made of metal or plastic material. In the latter case, the problem of insulating the junction pins and sleeves 39 and 53 would be solved. As will readily come to those skilled in the art, other parts could as well be made of electrically insulating material such as material or synthetic resins.

Although the above description and illustrations apply to an outlet assembly embedded in a floor, it is obvious that the assembly may also be embedded in a wall or any like places having a flat surface.

I claim:

1. A recessible electric outlet assembly to be mounted on a floor or the like, flush with the surface thereof, said assembly comprising:
 - a. telescopic inner and outer members, said inner members being movable between an operative extended position to an inoperative retracted position, said members terminating at one end with substantially flat transverse surfaces becoming flush with one another when in said inoperative position;
 - b. electric socket means on the side wall of said inner member so as to lie wholly within said outer member in said inoperative position of said members and outside said outer member and accessible for use in said operative position;
 - c. sealing means on at least one of said members at said one end to prevent entry of a liquid into said outer member;
 - d. electric circuit braking means including cooperating parts on said members operatively mated with one another in said operative position to make an electric junction and separated from each other in said inoperative position to brake said junction;
 - e. wiring means interconnecting said socket means and said circuit braking means parts of said inner member;
 - f. resilient means biasing said members into said operative position, and releasable locking means to hold said members in said inoperative position.
2. An assembly as claimed in claim 1 wherein said members are cylindrical and said sealing means is a first O-ring provided around said one end of said inner member adjacent the flat surface thereof and a second O-ring provided in the bore of said outer member around said one end and adjacent the flat surface thereof, said O-rings being disposed sealingly to contact one another in said inoperative position.
3. An assembly as claimed in claim 2 wherein said cooperating parts comprise:

a plurality of junction sleeves electrically insulatingly mounted at the top of said outer member below said O-ring;

a plurality of junction pins electrically insulatingly mounted at the end of said inner member lying inside of said outer member, said pins being disposed and being of a size each snugly to enter and fit into one of said sleeves in said operative position of said members whereby to establish an electrical contact, and

wiring means electrically interconnecting said sleeves and said socket means.

4. An outlet assembly as claimed in claim 1, wherein said locking means comprises:

a finger element mounted to be moved radially and inwardly of said outer member, said finger element having one of its ends bevelled to enter, in said inoperative position, a notch formed in the side wall of said inner member whereby to lock said members together;

a hollow case formed as an integral extension of said finger element at the end of said finger element opposite said bevelled end, said case being located in the lateral wall of said outer member;

a compression spring inside said hollow case and compressively maintained therein, whereby said bevelled end of said finger element is biased into said notch under the compressive action of said spring.

5. An outlet assembly as claimed in claim 4, including an opening through the lateral wall of said outer member for the insertion of said compression spring in said case.

6. An outlet assembly as claimed in claim 4, including means to release said locking means, said releasing means comprising:

a radially projecting flange formed at the end of said outer member flush with said floor surface;

a disc element provided in said flange above said finger element and said spring containing case;

said disc element having a downwardly projecting stud located in a free space defined by said flange and positioned adjacent said spring containing case, said stud coming into contact with said spring containing case when said disc is rotated, to push the finger element out of said notch.

7. An outlet assembly according to claim 6, wherein there is an O-ring provided around said disc element for providing fluid-tight sealing.

8. An outlet assembly as claimed in claim 1, wherein said locking means comprises:

a finger element mounted for movement radially and inwardly of said outer member, said finger element having one of its ends bevelled to enter, in said inoperative position, into a notch provided in the side wall of said inner member whereby to lock said members together;

a compression spring provided at the end of said finger element opposite said bevelled end, said compression spring urging said bevelled end of said finger element into said notch;

guide means for guiding said finger element in its ra-

dial displacements, and

a solenoid mounted around the end of said finger element opposite said bevelled end whereby when said solenoid is energized, it pulls said finger element out of said notch to release said locking means.

9. An outlet assembly as claimed in claim 1, wherein said locking means comprises:

a hollow case in the lateral wall of said outer member, one end of said case being adjacent the side wall of said inner member;

a latching ball element in said case at the end thereof adjacent said side wall of said inner member, said ball element facing, in said inoperative position, a notch formed in said wall of said inner member;

a compression spring in said case urging said ball element into said notch whereby to lock said members in said inoperative position.

10. An outlet assembly as claimed in claim 9, including means to release said locking means, said releasing means comprising a handle provided on the top of said inner member to be grasped by hand and pulled upwardly to cause dislodgment of said latching ball element from said notch.

11. An outlet assembly as claimed in claim 1, wherein said resilient means urging said inner member into operative position when said unlocking means are released comprises a compression spring housed inside said telescopic members and a plate at the upper end of said inner member, one end of said spring abutting said plate while the other end abuts a base at the inward end of said outer member.

12. An outlet assembly as claimed in claim 1, including means for connecting and disconnecting a first and a second series of electrical wires for energizing and deenergizing the sockets of said socket means, said means comprising:

an electrically insulating ring or lugs at the upper end of said outer member, said ring or lugs provided with junction sleeves;

junction pins provided at the lower end of said inner member;

said first series of electrical wires being connected at one end to said pins and at the other end to said sockets;

said second series of wires being connected at one end to said sleeves and connectible at the other end to a power supply source;

said pins adapted to enter said sleeves when said inner member is in extended operative position and to come out of said sleeves when said inner member moves to inoperative position.

13. An outlet assembly as claimed in claim 12, wherein said outer member has a base formed with an aperture for the passage of said second series of electrical wires.

14. An outlet assembly as claimed in claim 12, wherein said outer member is provided laterally with apertures for the passage of said second series of electrical wires.

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