Dec. 1, 1931. P. D. PHILLIPS 1,834,318

LIGHTING FIXTURE CONSTRUCTION

Filed March 28, 1928 2 Sheets-Sheet 1

Fig. 1.

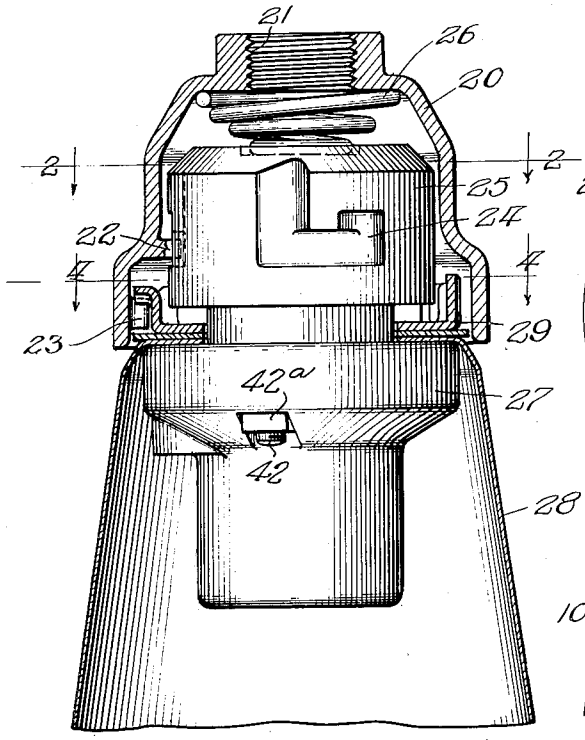


Fig. 2.

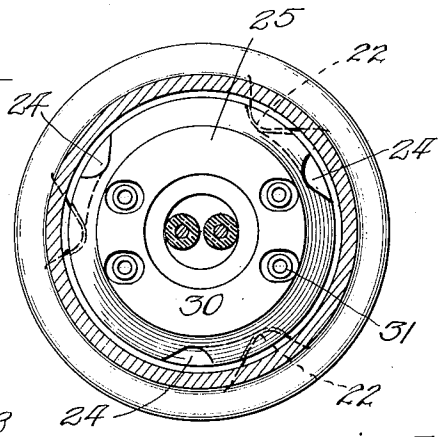


Fig. 5.

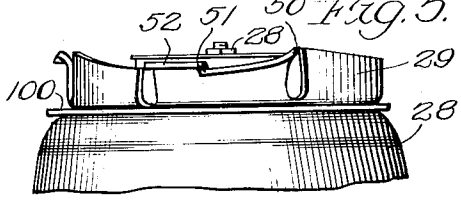


Fig. 4.

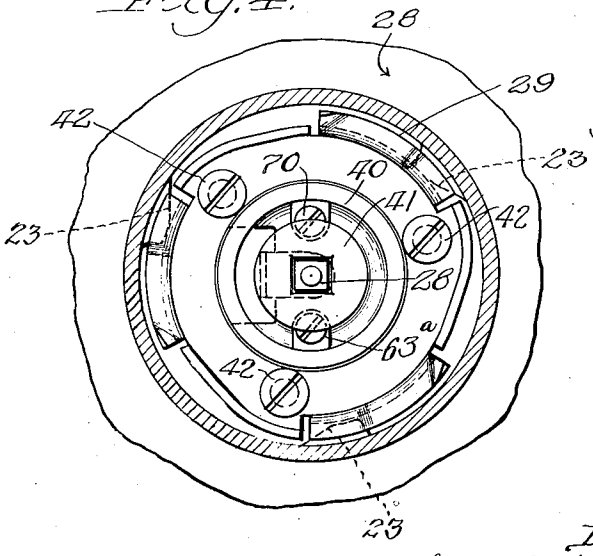
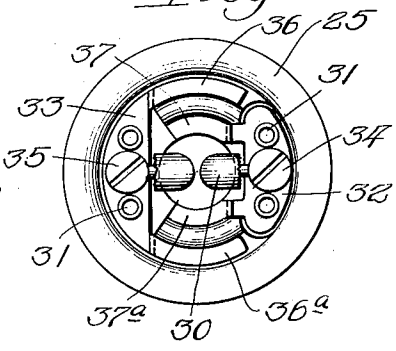


Fig. 3.



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LIGHTING FIXTURE CONSTRUCTION

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Fig. 6.

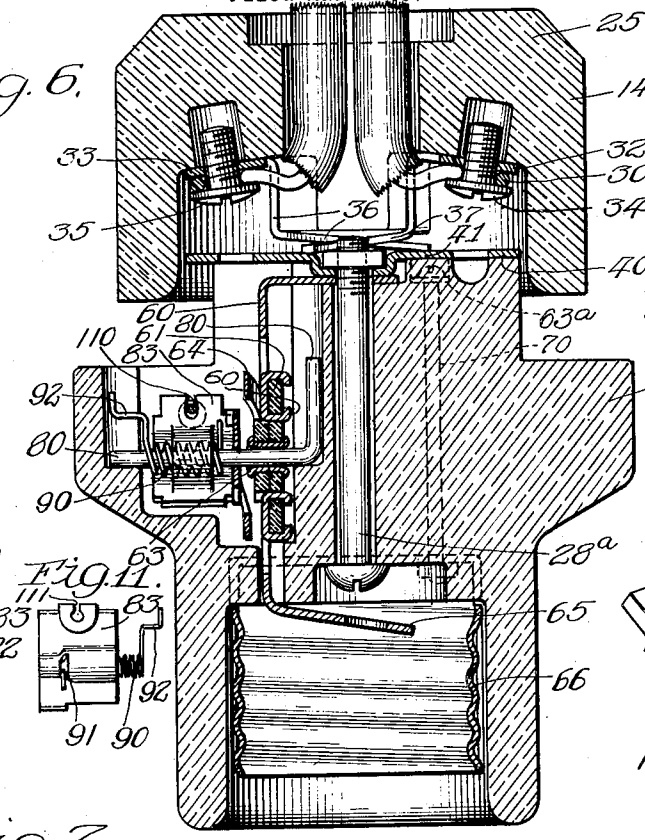


Fig. 12.

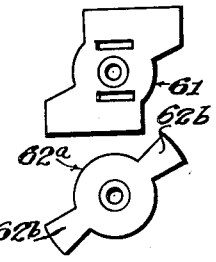


Fig. 9.

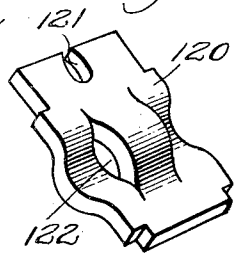


Fig. 10.

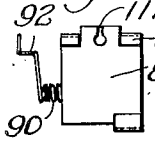


Fig. 11.

Fig. 7.

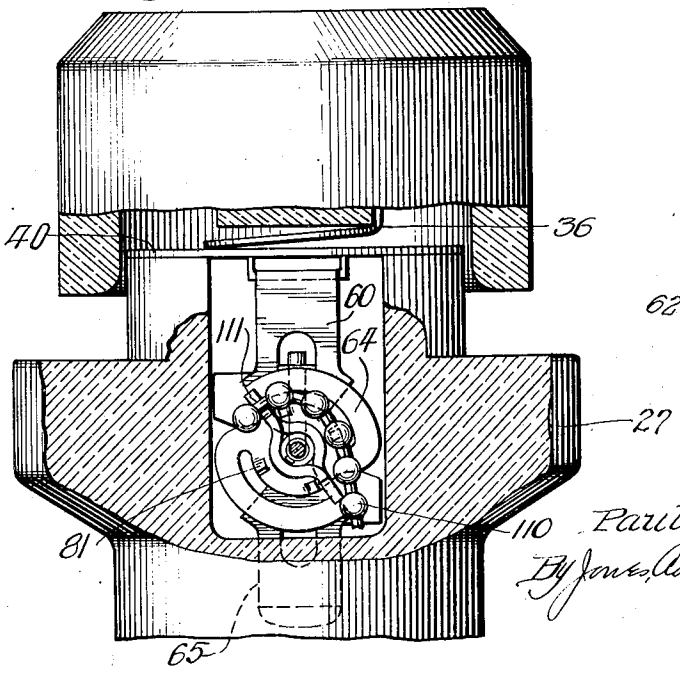
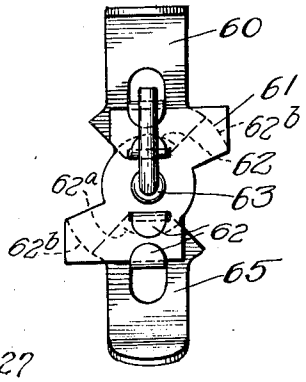


Fig. 8.



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UNITED STATES PATENT OFFICE

PAUL D. PHILLIPS, OF CHICAGO, ILLINOIS, ASSIGNOR TO BENJAMIN ELECTRIC MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

LIGHTING FIXTURE CONSTRUCTION

Application filed March 28, 1928. Serial No. 265,318.

My invention relates to a lighting fixture construction.

One of the objects of my invention is to provide an improved lighting fixture construction which will facilitate installation.

A further object is to provide a lighting fixture construction which will be durable, efficient, easy to assemble, and cheap to manufacture.

A further object of my invention is to provide a very simple, easily assembled and efficient type of pull socket which will occupy a minimum of space and is capable of operating an almost unlimited number of times substantially without deterioration.

Further objects will appear from the description, claims and drawings. In the drawings:

Figure 1 is a side elevational and partially sectional view showing a complete assembly of a housing and supporting cap member, an intermediate wiring base and connecting member, as well as a socket and reflector-supporting member;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1, showing the intermediate wiring base and connecting member;

Fig. 3 is a bottom view of the same member shown in Fig. 2;

Fig. 4 is a sectional view on the line 4—4 of Fig. 1, showing the socket assembly and reflector-supporting member;

Fig. 5 is a side elevational view of the bayonet joint connecting flange at the upper end of the said reflector-supporting and lamp socket assembly;

Fig. 6 is a sectional view on an enlarged scale of the combination wiring base and connecting member, as well as of the lamp socket itself;

Fig. 7 is a side elevation, partially in section, of the lamp socket showing the details of the commutator which forms a part of the pull switch arrangement;

Fig. 8 is a detail of a circuit interrupting member forming part of the pull switch;

Fig. 9 is a perspective drawing on an enlarged scale of a non-metallic commutator actuating member;

Figs. 10 and 11 are details on an enlarged scale of a modification of the commutator actuator member; Fig. 10 showing one side and Fig. 11 the obverse side of the same; and

Fig. 12 is an exploded view showing two insulating pieces.

The construction, according to the present invention, comprises a housing and supporting cap member 20, a combination wiring base and connecting member 25 having two wiring terminals 34 and 35 and two contacts 36 and 37 mounted thereon housed in and having a bayonet joint connection with the cap member; a combination housing and reflector-supporting member 28 also having a bayonet joint connection with the cap member and a pull switch receptacle housed in and secured to said reflector-supporting member and having a ring contact 40 for engagement with one of the contacts on the wiring base, and a disc contact 41 for engagement with the other contact on the wiring base whereby, when the bayonet joint connection is effected between the reflector-supporting member and the cap, the electrical connection will at the same time be effected between the two contacts on the receptacle and the two contacts on the wiring base.

The pull switch receptacle comprising an insulating base 27 having a switch receiving recess therein, a second recess therein for the receptacle contacts, shell and center contact members in the receptacle recess, a pair of screws for electrically connecting the shell contact with the annular contact (previously referred to) at the upper end of the base, said screws also serving to hold the shell contact on the base and a double break pull switch in the switch recess for controlling the circuit between the center contact member and the disc contact member (previously referred to) at the upper end of the base.

The pull switch mechanism comprises a metal L-shaped central supporting pin 80 having one arm seated in a groove in an insulating base 27 at one side of the switch recess, and having its other end seated in a groove at the other side of the switch recess, an insulating base (comprising two stampings of insulating sheet material 61 secured together by an eyelet 63, through which eye-

let the supporting pin extends), a contact member 64 through which said supporting pin extends and on which said commutator is rotatably mounted. A sheet metal stamping 65 having a contact portion for cooperating with the spring arms on the commutator, is secured to the insulating base 61 by means of bent over fingers 62 embracing the lower portion of the insulating base, said stamping terminating in the center contact member, previously referred to, a second sheet metal stamping 60 having a contact portion which also cooperates with the two spring arms on the contact 64, and which is secured to the upper end of the insulating base by means of a pair of bent over fingers embracing the upper portion of this base (said stamping extending upwardly and laterally into engagement with the disc contact 41, previously referred to,) an oscillatable actuator member 83 for imparting a step by step movement to the contact, a pull chain 110 for operating this actuator in one direction and a coil torsion returning spring 90 for returning this actuator when the pull chain is released. The contact is provided with ratchet teeth 81 for cooperation with an edge portion of the actuator member. The two spring arms of the contact hold the ratchet portion of the contact over against the edge of the actuator member to slide past the sloping face of the ratchet teeth on the return movement of the actuator. Each complete oscillation back and forth of the actuator member causes the contact to be advanced 90°. If the switch is in "off" position the two spring arms of the contact are resting respectively on the two wing portions of one of the stampings forming part of the insulating base. When the switch is moved from "off" to "on" position, the contact is rotated 90° and the two spring arms simultaneously snap off from the wing portions of the insulating stamping onto the two contact portions of the two stampings, respectively. When the contact is given another step of 90° to move it again from "on" to "off" position, the two spring arms of the contact snap off from the edges of the contact portions of the two stampings, respectively. Thus, in moving the switch from "off" to "on" position the circuit is quickly established, and in moving from "on" to "off" position the circuit is quickly broken at two points, thus effecting a double break in series.

A better understanding of the constructional details of my improved ceiling fixture construction will be had by a perusal of the eleven figures. In Fig. 1, it will be seen that there is provided a housing and supporting cap member 20 having a threaded opening 21 therein. This cap member 20 is preferably made of metal, but may obviously consist of a molded material, porcelain, or the like. This cap member is provided with two sets of projections so as to enable contact to be made with the same by means of bayonet joints upon other members about to be described. One set of lugs, of which there may be either two, three, or four, are located at the point 22 about one-third of the way up in the housing or cap member 20, and a second set of lugs are located near the bottom edge thereof at 23. The lugs 22 serve to engage suitably shaped recesses 24 located in the walls of the combination wiring base and connecting member 25.

This combination wiring base and connecting member 25 is preferably made of an insulating material such as porcelain, phenolic resin, molded material, hard rubber, or the like. The recesses 24 are so proportioned as to engage the lugs 22 in the supporting cap member forming therewith a connection usually termed a bayonet joint.

In order to secure the combination wiring base and connecting member within the housing member 20, a coiled compression spring 26 is provided. By this construction the combination wiring base and connecting member 25 will be resiliently held within the housing and supporting cap member 20 by a downward pressure of the spring 26, so that the said wiring base will "float" in the housing and any side strains or torsional strains about the same will be taken up by the spring 26 so that breakage of the member 25 will be prevented.

Still referring to Fig. 1, it will be seen that there is provided a combined socket and reflector-supporting assembly, which comprises the socket 27, the reflector 28 and a bayonet joint connection 29, which latter is shown in side elevation in detail in Fig. 5. The said flange bayonet connecting member 29 engages the lugs 23 on the housing and supporting cap member 20 while, at the same time, electrical connection is established between the combination wiring base 25 and the socket 27.

In order to show how this is accomplished, reference should be had to Figs. 2, 3, 4, 5, and 6.

Fig. 2 is a view of the top of the combination wiring base 25. This is made of some insulating material, and preferably of porcelain. It has a central opening through which pass two conducting wires 30 and is also provided with two openings through which, by means of tubular rivets 31, metallic conducting members 32 and 33 are affixed. The top view of Fig. 2 also plainly shows the relative position of the recesses 24 (in this case three of them), which serve to form the bayonet joint with the lugs 22 on the interior of the housing and supporting cap member 20.

The interior construction of the combination wiring base and connecting member 25 may be seen clearly in Fig. 3, which is a bottom view of the same looking upwards into

the housing 20, which here, for the sake of clearness, is omitted. As already stated, tubular rivets 31 serve to hold the two metallic conducting members 32 and 33, provided at their respective centers with wire-securing screw-terminals 34 and 35. The member 33 is provided with two projections 36 and 36*a* which lie just within the inner periphery of the insulating material of which the combination wiring base and connecting member 25 is made. The conducting member 32 is also provided with two of such metallic members 37 and 37*a* integral therewith and lying concentric with the aforesaid member 36 nearer the center of the combination wiring base and preferably just adjacent to the central opening thereof. As will be seen in Fig. 3, the insulating material of which the base 25 is made lies between the two said members and insulates the same from each other. It is also to be understood, and as much more plainly seen in Fig. 6, the members 36 and 36*a* and 37 and 37*a* lie on a different plane than the members 32 and 33, respectively. The wires 30 are held in contact with the members 32 and 33 by being clamped under the screw-terminals 35 and 34.

The metallic members 36 and 36*a* make contact respectively with an annular ring 40 located at the upper end of the socket and reflector-supporting member 27. As will be seen in Fig. 4, which is a top view of the socket and reflector-supporting member, two such electrical contacts are provided. One of these is in the form of an annular ring 40, whereas the other one consists of a disc 41, these being insulated from each other by means of the insulation of which the socket 27 is composed and which is preferably, but not necessarily, porcelain. When the combination wiring base and connecting member 25 is superimposed upon the socket and reflector-supporting member 27, the metallic members 36 and 36*a* contact with the ring 40 and the members 37 and 37*a* contact with the disc 41, thus establishing electrical connection with the socket. The reflector 28 and socket 27, which are one assembly, are held to the housing 20 by a bayonet joint which comprises the lugs 23 in the housing 20 and the flanges on the reflector and socket supporting member 29. A ring 100 of cushioning material is interposed between the member 29 and the reflector proper 28. Three screws 42 extending through the members 28 and 29 and socket 27 as shown in Figs. 1 and 4 serve to hold the member 29 the reflector 28 and socket 27 together.

The flanges 29 on the socket and reflector-supporting member have a peculiar outline, as may clearly be seen in Fig. 5, and are so shaped that the mere superposition of the supporting cap member 20 upon the flanges 29 followed by a rotatory movement will cause the engagement of the upwardly turned ends 50 of the flanges 29 with the lugs 23 on the supporting cap member, and the said lugs will then pass under the gradually descending flanges 29 until the offset 51 is reached, whereupon the lugs 23, being urged upwardly as a result of the spring pressure produced by the spring 26, will engage the substantially horizontal portion 52 of the flanges, thus successfully and tightly locking the bayonet joint effected by the interengagement of the lugs 23 and the flanges 29 against release. If release of the assembly is desired, it is necessary to push the socket supporting member 27 into the housing 20 while making a rotatory movement the reverse of that just described. This construction prevents the assembled unit from being loosened by vibrations which may occur when the entire installation is placed in a machine shop, moving car, or the like.

For the description, which is to follow, reference should be had to Figs. 6 to 11. The establishment of the electrical connections between the wires 30, the metallic members 36 and 37, and the disc 41, and the annular ring 40 has already been described. The further carrying of the current through the device is brought about as follows: The central disc 41 is in contact with a flat conducting member 60, bent at right angles so that the horizontal portion contacts with the disc. The vertical portion passes downwardly through the insulating socket supporting member 27 terminating after a short distance in a piece of insulating material 61, preferably of the laminated type, being held therein by having the ends of the metallic piece 60 provided with gripping fingers 62, which pass through apertures in the insulating material 61. This insulating material has superimposed upon it a similar piece of insulating material 62*a* provided with wings 62*b*, the two pieces of insulating material being held together by an eyelet 63. (For details see Fig. 8.) The wing extensions of the second piece of insulating material serve to support a commutator member 64 out of contact with the metallic conducting member 60. At the lower end of the insulating material 61, there is a corresponding metallic conducting member 65 which is likewise attached in an entirely similar manner to the piece 60 of the insulating material, and this conducting member 65 extends through an aperture in the molded insulating base 27 into the socket base proper, into which an electrical lamp is adapted to be inserted. After the insertion of the piece 65, it is bent substantially at about an 80° angle and forms a center contact for the incandescent bulb. (See Fig. 6.)

The contact member 64, when turned about its axis 90°, will establish contact between the metallic members 60 and 65 so that when in the said position electrical connection will be established between the central disc 41 and

the central contact 65. The shell 66 of the socket, preferably made of copper or bronze, is provided with the usual screw-threads common to incandescent lamp sockets, and is supported within the insulating base 27 by two screws 70 passing upwardly through the said base 27, the upper end of said screws being in contact with the ring 40. The upper end of the screws 70 are shown in Fig. 4, where they pass through the lugs 63*a* which are integral with the annular conducting member 40. The disc 41 is held to the insulating base 27 by means of a centrally located screw 28*a*.

It will thus be seen that a complete electrical circuit may be established when the contact is in contact with the metallic members 60 and 65, respectively, through an incandescent lamp (not shown) inserted into the socket, the path of current being as follows: From one wire 30 through conducting member 32 to disc 41, through metallic member 60, contact 64, metallic member 65, to the center contact of the lamp, through the filaments thereof, through the shell 66 of the socket, through the screws 70, to the ring 40, to the conducting member 36, to the other wire.

The pull switch mechanism comprises a metallic L-shaped central supporting pin 80 having one arm thereof seated in a groove in the insulating base at one side of the switch recess, and having its other end seated in a groove at the outer side of the switch recess. An insulating base 61 comprised of two stampings of insulating sheet metal, as already described, are secured together by the eyelet 63, through which eyelet the said supporting pin 80 extends. The contact member 64 is likewise supported by this pin passing through the central opening thereof, as shown in section in Fig. 6. The contact member 64 is rotatably mounted on the pin 80 and is provided with a number of ratchet teeth 81 for engagement and cooperation with an oscillatable actuator member 82. The said actuator member 82 consists of a piece of laminated insulating material to which is clamped, by means of bent over fingers, a metallic piece 83. The said metallic piece 83 is bent in such form that allows of the insertion not only of the pin 80 but of a spring 90, the curled portion of which surrounds the pin 80 so that in fact the oscillatable actuator member will be pivoted upon the convolutions of the spring 90 at least for a greater portion of the length thereof.

As seen in Fig. 11 one end of the spring 90 projects through an opening 91 in the metallic sleeve formed by the metallic piece 83 so as to prevent the spring from turning beyond a certain point. The other end 92 of the spring 90 rests in the same groove as the end of the pin 80. A pull chain 110 engages the opening 111 in the insulating portion 82 of the commutator actuating member, shown in Figs. 10 and 11, so that the same may be oscillated by pulling upon said chain. The ratchet teeth 81 on the commutator 64 serve to engage the edge of the actuator comprised of the insulating material 82 of the metallic portion 83 cooperating therewith so that upon each oscillation of said actuator member, the contact 64 will be rotated 90°. The said contact member 64 is preferably made of phosphor bronze or similar resilient metallic material, and is so shaped that the spring arms of the contact hold the ratchet portions of the contact over against the edge of the actuator, the spring arms yielding sufficiently to permit the edge of the actuator member to slide past the ratchet teeth upon the return motion of the actuator.

The contact member 64 is prevented from moving in the opposite direction by the engagement of the resilient ends thereof with the wing members of the insulating material 61 when the switch is in the "on" position; and retained by contact of the said resilient arms with the other portion of the insulating material when the switch is in the "off" position. The entire contact is sufficiently resilient to permit the ratchet teeth 81 thereon to slide past the actuator member on the latter's return movement. The tension in the coil spring 90 is such that it acts as a compression spring as well as a torsion spring so that it tends to hold the edge of the member 82 over against the spring ratchet teeth 81.

When the switch is in the "off" position, the two spring arms of the contact 64 are resting, respectively, on the two wing portions of one of the insulating stampings forming part of the insulating base 61. When the switch is moved from the "off" to the "on" position, the contact being rotated 90°, the two spring arms simultaneously snap off from the wing portions 61 onto the two metallic contact members comprised of the metallic members 60 and 65, already mentioned, thus establishing the circuit. When the contact is given another step of 90° to move it from the "on" to the "off" position, the two spring arms of the contact 64 snap off from the edges of the contact portions of the two stampings 60 and 65, respectively, thus moving the switch from "off" to "on" position.

An alternative form of actuator member is that shown in perspective in Fig. 9, in which case the entire member 120 is made of one single unitary structure consisting of a piece of vulcanized fiber. In Fig. 9, the opening 121 corresponds to the opening 111 in the actuator, according to the types shown in Figs. 10 and 11, while the central opening 122 serves to contain the spring and also the pin 80. The actuator as shown in Fig. 9, when made of a hard, indurated, vulcanized fiber, is sufficiently hard to actuate the ratchet teeth 81 on the contact 64 in a similar manner to the insulating material 82 used in the actua-

tor, as described in connection with Figs. 10 and 11, and I wish it to be understood that other types of actuators may be used with equal effect. The latter type of actuator, namely the one made of insulating material, consists of one single piece of vulcanized fiber stamped out and given the shape shown in Fig. 9 by steaming the same and then pressing it in a hot mold. For outdoor use, however, I prefer the type of actuator shown in Figs. 10 and 11, as this form is not adversely affected by moisture.

The pull chain 110 passes through an opening in the insulating base 27 in the usual manner customary with pull sockets, and the openings through which it rises are preferably so proportioned that it will just barely pass therethrough, so that upon the return of the actuator member and upon a movement of the torsional spring 90° the beads of the pull chain will not be thrown any substantial distance upwards whereby accidental contact with the live parts of the switch might be caused, which is to be avoided as it would interfere with the safe operation of the switch.

The assembly of the improved form of switch, in accordance with my present invention, is very simple. There being only five parts in the entire mechanism, the cost of production is low and as the parts can be made with sufficient accuracy to be interchangeable, they can be turned out on automatic machines in great numbers and may be assembled into a unit with a minimum of effort. The assembly is substantially as follows: The metallic members 60 and 65, together with the thereto attached insulating portions 61 and 62, form one assembly, which is shown by itself in Fig. 8. The L-shaped pin 80 is inserted through the eyelet 63, whereupon the contact member 64 is also placed upon the pin 80 following which the actuator member and springs are placed on the pin 80, whereupon the entire assembly is pushed down into the insulating base 27 in such a manner that the end 92 of the spring 90 will also lie within the groove holding the straight end of the pin 80. The insertion of the pull chain 110 into the opening 111 is obvious.

A particularly novel feature of this construction lies in the compact arrangement of the switch and actuator.

It will thus be seen that I have provided an extremely simple and efficient structure which may be quickly assembled without the necessity of any tools, and which is so constructed that the parts thereof are all interchangeable and may be kept in stock and assembled into complete units as desired. From a commercial point of view this is a distinct advantage and is especially valuable in connection with commercial installations, such as in factories, park and street lighting, etc. Obvious mechanical equivalents and modifications within the skill of the mechanic are to be considered as strictly within the scope of my invention, for which I claim:

1. An electrical incandescent lamp fixture comprising in combination (1) a metallic housing and supporting cap member having two sets of lugs for effecting bayonet joints located on the inner periphery thereof, (2) a combination wiring base and connecting member, wiring terminals and metallic contacting members on said wiring base and grooves for forming a bayonet joint connection with one set of said lugs (3) a combination housing and reflector-supporting member comprising an incandescent lamp socket and flanges for forming a bayonet joint with the second set of aforesaid lugs, whereby when mechanical connection is established between said bayonet joints electrical connection is likewise established between said wiring base and socket.

2. An electrical incandescent lamp fixture comprising (1) a metallic housing, (2) two sets of lugs for effecting bayonet joints on the interior of said housing, (3) a combination wiring base having grooves for cooperating with one set of said lugs, two sets of metallic wiring terminals and electrical contacts in said wiring base, (4) a combined lamp socket and reflector-supporting member, and (5) flanges on the upper end of said combined member for cooperating with the second set of lugs.

3. An electrical incandescent lamp fixture comprising (1) a metallic housing, (2) two sets of lugs for effecting bayonet joints on the interior of said housing, (3) a combination wiring base having grooves for cooperating with one set of said lugs, two sets of metallic wiring terminals and electrical contacts in said wiring base, (4) a combined lamp socket and reflector-supporting member, (5) flanges on the upper end of said combined member for cooperating with the second set of lugs, and (6) a pull switch mechanism in said lamp socket member.

4. A pull switch mechanism comprising a centrally located pivotal pin, insulating members affixed to each other by a hollow rivet positioned centrally of said members, said pin passing through said rivet, two spaced metallic contacting members secured to said insulating members, a resilient metallic contact member pivoted on said pin, ratchet teeth on said contact, a contact-actuating member pivoted on said pin, a torsion spring on said pin and interposed between said actuator and said pin so as to form a bushing for the actuator, a pull chain for moving said actuator, and means for preventing the reverse movement of said contact when said actuator makes its return movement.

5. A pull switch receptacle construction comprising an insulating base having a switch recess therein and two grooves, one on each side of said switch recess, an L-shaped

central supporting pin having one arm seated in one of the grooves, having its other end seated in the other groove, an insulating support having an opening through which said pin extends, a sheet-metal stamping secured to the upper end of said insulating support, said stamping having a contact portion and a conductor portion leading from said contact portion to the upper end of the insulating base, a second stamping secured to the lower end of the insulating support, said second stamping comprising a contact portion and a conductor portion leading from said contact portion and terminating in a receptacle contact, a contact rotatably mounted on said supporting pin and having a pair of spring contact arms for cooperation with the contacts on said stampings, said contact having a ratchet portion and an oscillatable actuator member rotatably mounted on said supporting pin for giving a step by step movement to said contact.

6. A pull switch construction comprising a rotatable contact and an oscillatable actuator for giving a step by step movement to the rotatable contact, and a central supporting pin on which said contact and actuator are mounted, said contact having a ratchet face, and said actuator comprising a member of sheet-material having portions formed therefrom to embrace said supporting pin, said supporting pin lying in the general plane of the actuator member, one edge of said actuator engaging the ratchet teeth of the contact.

7. A pull switch construction comprising a rotatable contact, an oscillatable actuator and a central supporting pin on which said contact and actuator are mounted, said contact having a ratchet portion, and said actuator being of sheet-material, said central supporting pin lying in the general plane of the actuator, one of the edges of said sheet-material actuator engaging the ratchet portion of the contact.

8. A pull switch construction comprising an insulating support, having an opening therein, a central supporting pin extending through said opening, a contact rotatably mounted on said supporting pin, and a pair of stationary contacts mounted on said insulating support, said insulating support comprising two members of insulating sheet-material lying one against the other, one of said members having a pair of wing portions, said stationary contacts being secured to the other member of insulating sheet-material and said rotatable contact comprising a pair of spring contact arms which snap off from said insulating wing portions into engagement with said contact portions in moving from "off" to "on" position.

9. A pull switch construction comprising an insulating support, having an opening therein, a central supporting pin extending through said opening, a contact rotatably mounted on said supporting pin, and a pair of stationary contacts mounted on said insulating support, said insulating support comprising two members of insulating sheet-material lying one against the other, one of said members having a pair of wing portions, said stationary contacts being secured to the other member of insulating sheet-material and said rotatable contact comprising a pair of spring contact arms which snap off from said insulating wing portions into engagement with said contact portions in moving from "off" to "on" position, one of said stationary contacts having a receptacle contact member formed as an integral part thereof.

10. A ceiling fixture construction comprising a unit to be secured to the ceiling and a second unit detachably secured to said first unit, said first unit comprising a wiring base, an inverted housing in which said wiring base is mounted and spring means tending to force said wiring base downwardly, said housing being provided with means for holding said wiring base against the spring pressure, said wiring base being movable upwardly in the housing against the spring pressure and being provided with wiring terminals and readily engageable and disengageable contact members, said second unit comprising a reflector member and a lamp socket carried thereby, said second unit being provided with means whereby it may be connected with the first unit by pressing it upwardly to force the wiring base upwardly against the spring pressure, turning the reflector member about its axis, and then allowing the spring to force the wiring base and second unit downwardly into secured position, said socket comprising lamp contacts and readily engageable and disengageable contacts for engagement with the contacts on the wiring base.

In witness whereof, I have hereunto subscribed my name.

PAUL D. PHILLIPS.