No. 635,058. Patented Oct. 17, 1899.

W. J. PHELPS.

ELECTRIC INCANDESCENT LAMP.

(Application filed May 23, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

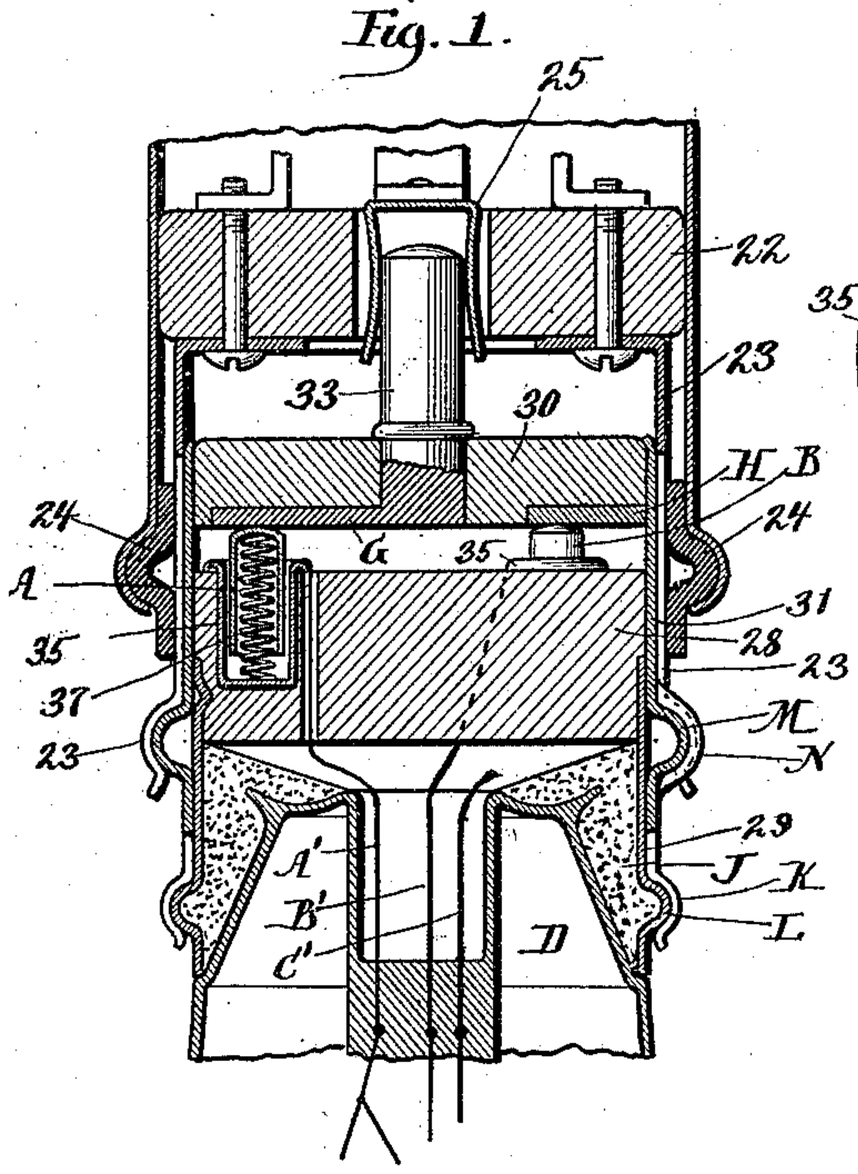

Fig. 2.

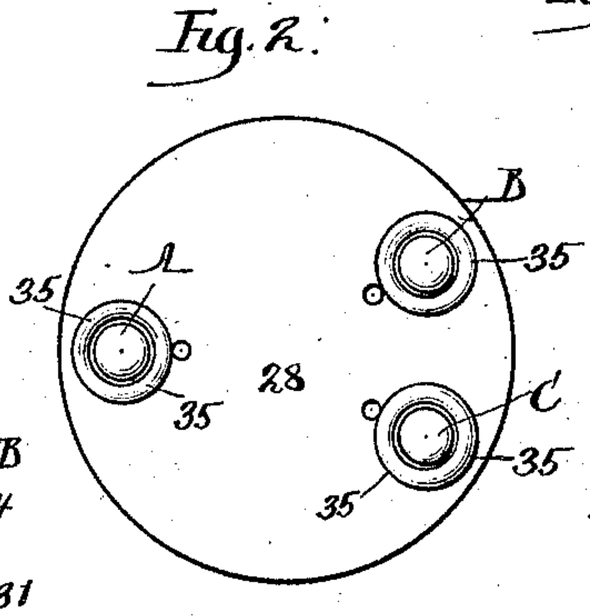

Fig. 3.

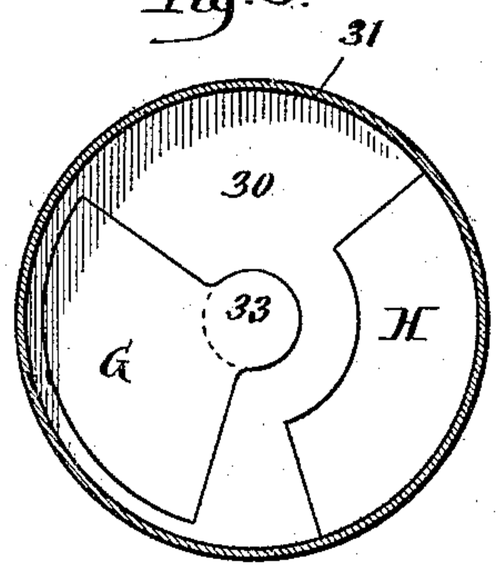

Fig. 4.

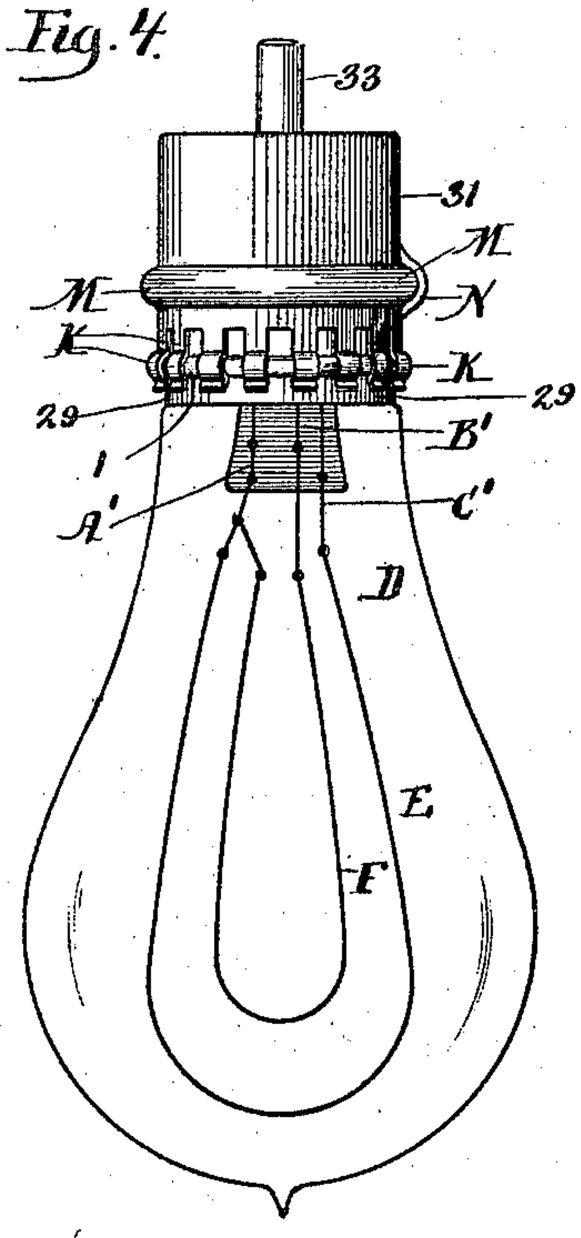

Fig. 5.

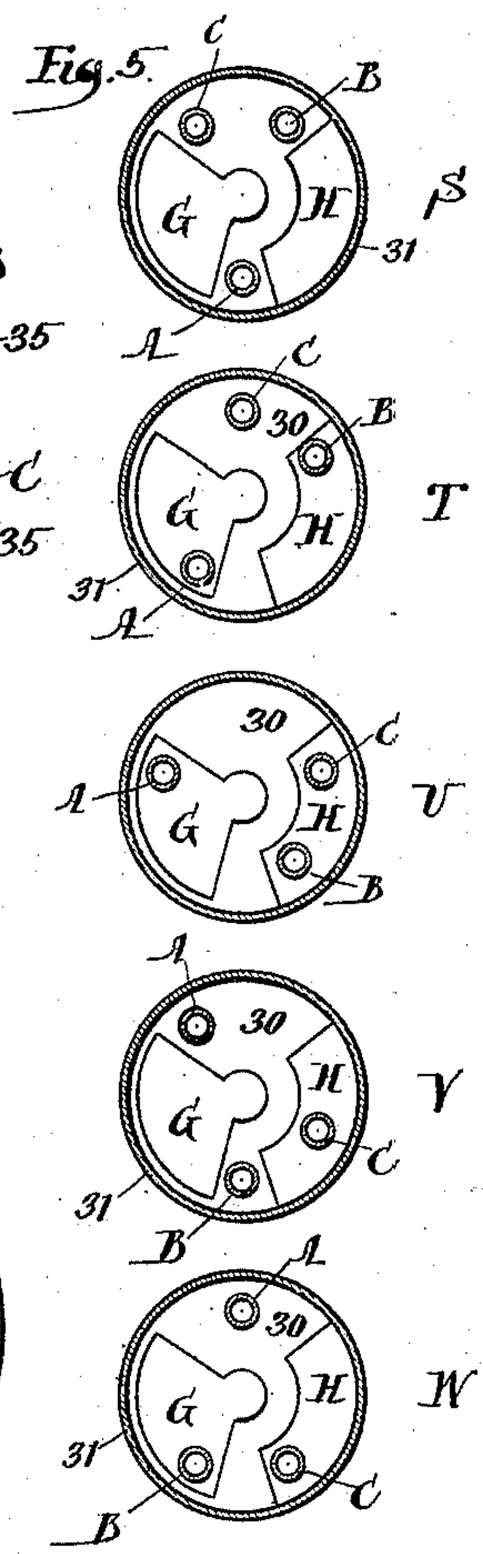

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Fig. 6.

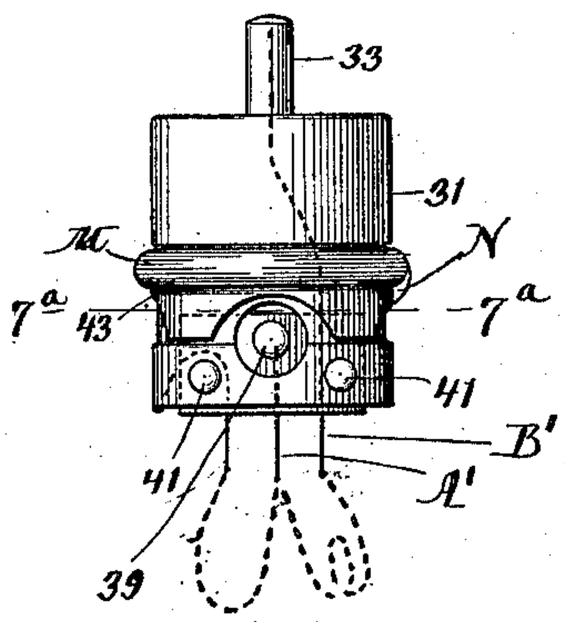


Fig. 7a.

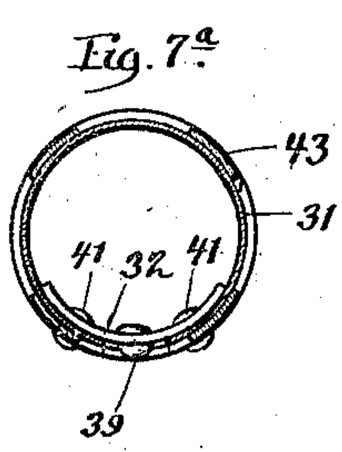


Fig. 7.

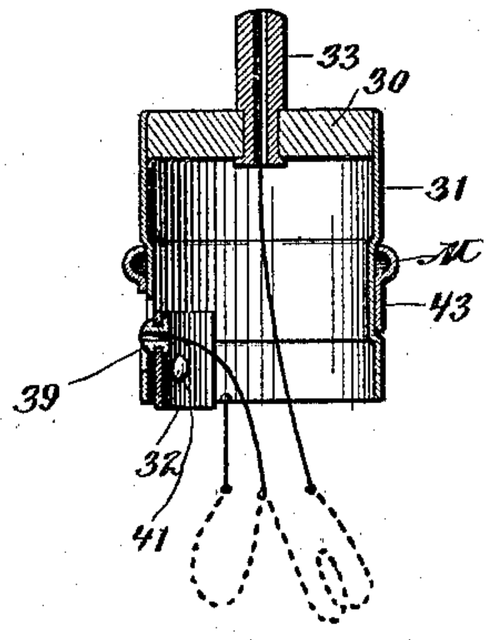


Fig. 8.

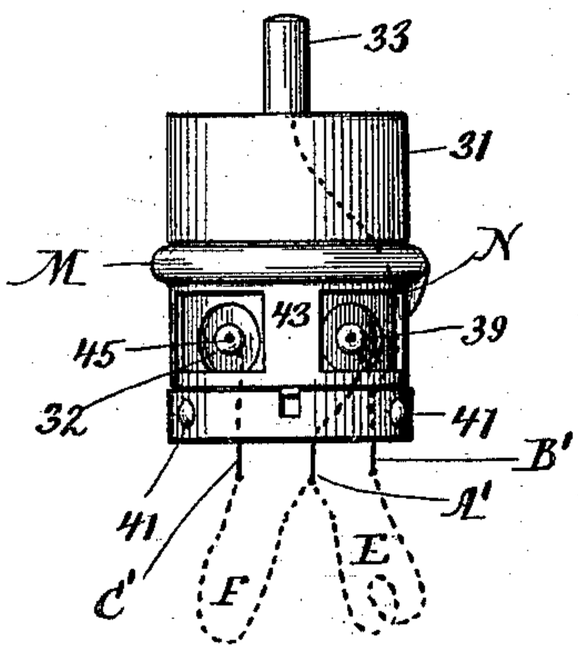


Fig. 10.

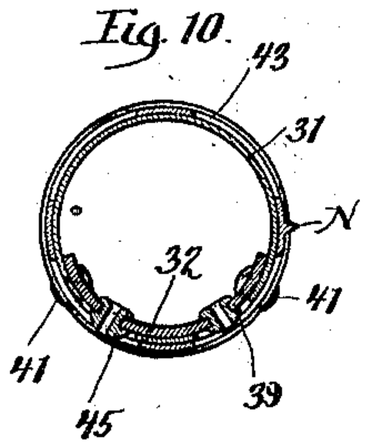


Fig. 9.

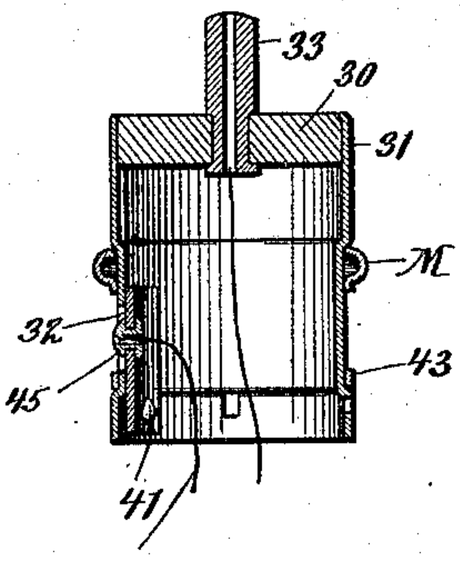


Fig. 11.

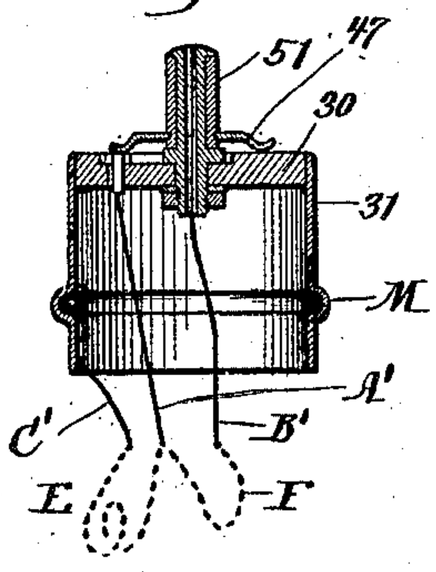


Fig. 12.

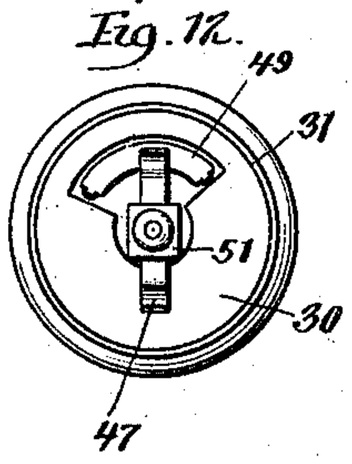
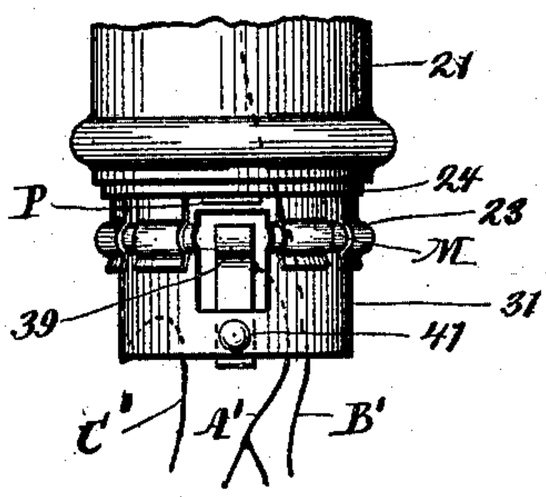


Fig. 13.



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UNITED STATES PATENT OFFICE.

WILLIAM J. PHELPS, OF ELMWOOD, ILLINOIS.

ELECTRIC INCANDESCENT LAMP.

SPECIFICATION forming part of Letters Patent No. 635,058, dated October 17, 1899.

Application filed May 23, 1898. Serial No. 681,455. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. PHELPS, a resident of Elmwood, in the county of Peoria, State of Illinois, have invented certain new and useful Improvements in Electric Incandescent Lamps, of which the following is hereby declared to be a full, clear, and exact description, sufficient to enable others skilled in the art to make and use the same.

My invention relates to that class of incandescent lamps which are adapted to the Westinghouse type of socket; and my object is to provide means whereby the flow of electric current may be cut off or changed by rotating the lamp-bulb on its longitudinal axis.

The nature of the improvements will appear in detail from the description following and will be more particularly pointed out by claims at the conclusion thereof.

In the accompanying drawings like parts of structure are denoted by like designation throughout.

Figures 1, 2, 3, 4, and 5 illustrate a form of lamp arranged for the series-parallel commutation of two filaments, Fig. 1 being an enlarged section of the lamp-base and a portion of the lamp and socket, Fig. 4 an elevation of the complete lamp, Figs. 2 and 3 plan views, and Fig. 5 a diagrammatic representation of the several circuit changes which are possible in the lamp. Figs. 6 and 7 show, respectively, in elevation and vertical section a form of lamp-base adapted to shunt or disconnect one of two filaments. Fig. 8 is an elevation, Fig. 9 a vertical section, and Fig. 10 a horizontal section, of a lamp-base fitted with two insulated terminals to which current may be passed at will. Fig. 11 is a vertical section, and Fig. 12 a horizontal section, of a lamp-base in which a switching mechanism is operated by the revolution of the central contact-pin common to the Westinghouse type of lamp-base. Fig. 13 shows in elevation part of a Westinghouse socket and a lamp-base with a portion of the lamp, this structure being adapted to Westinghouse-type sockets from which one of the supporting-fingers has been removed.

Referring to Fig. 1, the parts 21, 22, 23, 24, 25, and 27 constitute a portion of a Westinghouse-type socket, shown approximately twice the actual size in order to exhibit the relation of the several parts clearly. The spring-fingers 23, which are formed so as to grasp a ridge on the lamp-base, are insulated from the outer shell of the socket by the fiber washer 24 and are supported from the porcelain disk 22 in the manner shown. The fingers 23 constitute one electrical terminal of the socket, the other terminal being the U-shaped spring 25.

D is a portion of the vacuum-bulb of a lamp, and A′, B′, and C′ are leading-in wires. The lamp D is secured in a metal thimble 29 by the plaster-of-paris filling J. The disk 28, of insulating material, (preferably porcelain,) is secured in one end of the thimble 29. A metal sleeve 31 surrounds disk 28 and thimble 29 and is fitted with fingers K, which grasp the annular ridge L of thimble 29, permitting the same to be rotated on its longitudinal axis. The sleeve 31 is also provided with the annular ridge M, which is grasped by the socket-fingers 23; but the rotation of 31 is prevented by the feather N, which enters the space between two of the fingers 23. The disk 30, secured in the upper end of sleeve 31, carries the segmental contacts H and G. Contact G carries the pin 33, which receives current from spring 25, and contact H is in electrical connection with sleeve 31, which conducts current to the fingers 23. The disk 28 carries three plungers, two of which are shown at A and B. Said plungers are contained in capsules 35 and are forced outward by spiral springs 37. In Fig. 2 disk 28 and plungers A, B, and C are shown in plan view, (double size,) looking down, and in Fig. 3 disk 30 and segmental contacts G and H are shown in plan view, looking up.

Referring to Fig. 4, the complete lamp is shown with the filaments E and F, (preferably of different candle-power,) each adapted to the voltage of the circuit for which the lamp is designed. One end of each filament is connected to the leading-in wire A′. It will be seen from the relation of the parts above described that the lamp, as shown in Fig. 4, may be inserted into any Westinghouse-type socket. The pin 33 will then make contact with the terminal 25, and the thimble 31 will make contact with the fingers 23. Since the feather N, entering between two of the fingers 23, prevents the rotation of the sleeve 31,

if the lamp D and thimble 29 be rotated the two disks 28 and 30 will be rotated with reference to each other.

Referring now to Fig. 5, a plan view of the disk 30 is shown, looking up, and the various positions of the plungers carried by disk 28 are indicated by circles at A, B, and C. Remembering that one end of filament F is connected to plunger B, one end of filament E to plunger C, and that the opposite ends of both filaments are connected to plunger A, it will be seen that the rotation of said plungers with reference to the segmental contacts G and H, which are in connection with the terminals of an electric circuit, will serve to turn the current through either of the filaments alone, both filaments in parallel, both filaments in series, or to turn off the current altogether. If the filament E be of twenty-candle power and the filament F of ten-candle power, the light emitted by the lamp in various angular positions will be as follows, viz: In position S, Fig. 5, all the plungers A, B, and C being on the insulating-disk 30, the lamp will be dark. On turning the lamp D to the right through about one-eighth of a circle plunger B will rest on contact H and plunger A on contact G. Current will now flow from spring 25 to pin 33 and contact G, thence to plunger A, spring 37, capsule 35, and leading-in wire A′ to filament F. From filament F current flows through leading-in wire B′ to plunger B and thence to contact H and fingers 23. Filament F will now be alight with ten-candle power. On turning the lamp farther to the right (position U) plungers B and C rest on contact H, and current flows from A through both filaments in parallel to B and C. In this position a light of thirty-candle power is emitted. In the next position (V) plunger C rests on contact H; but since the plungers A and B rest on the insulated disk no current flows and the lamp is dark. A still further rotation of the lamp to the right (position W) brings plunger B on contact G, plunger C on contact H, and plunger A on the disk 30. Current now flows from plunger B through filament F to plunger A, and thence through filament E to plunger C. Both filaments now being in series, their joint resistance is so great that the current will be insufficient to bring them up to full incandescence, and the light emitted will be of only about one or two candle power. In position X the lamp is dark, corresponding to position V. In position Y plungers B and C rest on contact G, plunger A on contact H, and both filaments give together thirty-candle power. In the last position (Z) current flows from plunger C through filament E to plunger A, giving a light of twenty-candle power. Generally the friction of the parts will hold the lamp in any of the positions; but means may be provided, either through suitable depressions in disk 30 and contacts H and G, in which the plungers may sink slightly, or through other means, to determine the proper angular location of the disks with reference to each other in order to secure the several positions and to retain them in such positions until considerable force is applied to the lamp.

In Figs. 6 and 7, 33 is a metal pin held in the center of an insulating-disk 30, which is secured in one end of the metal thimble 31. A sleeve 43 rests in a shallow circumferential groove in the thimble 31. Said sleeve 43 has the annular ridge *u*, of contour suitable to be grasped by the fingers of a Westinghouse-type socket. A plate of insulating material 32 is secured inside thimble 31 by two rivets 41. A third rivet 39 is fastened in plate 32 opposite an opening in thimble 31, through which it projects far enough to make electrical contact with certain tooth-like extensions of sleeve 43.

The parts above described constitute a lamp-base suitable for introduction into a Westinghouse socket. The vacuum-bulb and other parts of the lamp proper are omitted from the drawings; but the filaments are indicated diagrammatically at E and F, with leading-in wires at A′ B′ C′. The path of current in the position shown is from pin 33, through leading-in wire B′ to filament E, and thence through leading-in wire A′ and filament F to the thimble 31 and sleeve 43. Both filaments will then receive current in series. If now the lamp and thimble 31 be rotated, sleeve 43 will remain stationary, (on account of the feather N, which will encounter one of the fingers of the socket,) and one of the extensions—say O—of the sleeve 43 will be brought into contact with the rivet 39. In this position current will pass from filament E directly to sleeve 43 through the superior path afforded by leading-in wire A′ and rivet 39.

The construction shown in Figs. 8, 9, and 10 differs from that shown in Figs. 6 and 7 in having an extra insulated contact 45 to which the leading-in wire C′ is connected instead of being directly connected to thimble 31. It will be understood, as before, that the vacuum-bulb is omitted and that the filaments are indicated diagrammatically. When this base is introduced into a Westinghouse-type socket, the fingers of said socket, one of which is shown at 23, Fig. 8, grasp the annular ridge M of the sleeve 43. The feather N, attached to sleeve 43, enters between two of the socket-fingers and holds the sleeve in one position. If the lamp and thimble 31 be now rotated on the longitudinal axis, the sleeve 43 being stationary, one of the bars—say O—of the sleeve 43 may be brought into contact with either of the rivets 39 or 45. When in contact with rivet 45, current flows from pin 33 through both filaments in series to rivet 45 and sleeve 43, whence it passes by the socket-fingers 23 to the pole of the electric circuit. If the lamp be rotated to the left, bar O will leave rivet 45, cutting off all flow

of current; but a further rotation to the left will bring bar O in contact with rivet 39, thereby restoring the flow of current, but now through filament E alone.

It may be desirable to operate switching mechanism by the rotation of the contact-pin relatively to some other part of the lamp-base. Such a design is shown in vertical and longitudinal section in Figs. 11 and 12, where the pin 33 carries a long rectangular nut 51, to which is secured the spring-bar 47, moving over the segmental contact 49. When this lamp-base is introduced into a Westinghouse-type socket, the construction is such that the nut 51, and with it the bar 47, is held from rotating by the spring-contact 25, Fig. 1, of the socket; but the shell 31 and disk 30 may be revolved, the pin 33 turning within the nut 51. This brings the contact 49 under the bar 47, shunting the filament F. When 47 and 49 are separated, the current is forced to pass through both filaments in series from shell 31 to pin 33.

Referring to Fig. 13, a portion of a Westinghouse-type socket is shown, comprising the outer shell 21, the insulating-ring 24, and the fingers 23. The fingers 23 grasp the annular ridge of the thimble 31; but one of the fingers P is partly cut away, as shown. A section of the ridge M and thimble 31 is cut out, leaving an opening through which the false ridge 39 projects. This latter is supported on thimble 31, but insulated from it. The leading-in wire A is connected to the false ridge 39, and the other leading-in wires are connected, respectively, to the thimble 31 and to a terminal pin (not shown) after the manner of the structures shown in the other figures. In the position shown in Fig. 13 the false ridge 39, being opposite the space created by cutting off the socket-finger P, is not connected to the circuit, and current will flow from the terminal pin through two filaments in series to thimble 31. If now the lamp in the grasp of the socket-fingers be rotated to the right or left, the false ridge 39 will be brought into contact with the fingers and current will flow directly from the leading-in wire A to socket-fingers through the superior path afforded by false ridge 39, thus shunting out whatever filament or resistance may be included between the leading-in wires A′ and C′.

While I have shown in the figures a lamp in which two filaments are arranged for series-parallel commutation and also a lamp in which two filaments in series or one filament alone receives current, I do not wish to be limited in the application of my improvement to these two combinations or to any particular arrangement of connections for one or more filaments within a lamp. My invention relates solely to the means whereby any kind of switching or shunting of current is effected through the rotation of the lamp on its longitudinal axis within a Westinghouse-type socket. For example, the construction shown in Figs. 6 and 7 may be used to pass current through two filaments in parallel, one of which is permanently connected to the lamp-terminals and the other of which receives current at will through the operation of the sleeve and contact shown. In like manner the variant shown in Figs. 8, 9, and 10 may be used to convey current at will through either of two filaments in parallel, or three filaments may be used, one of which is permanently connected to the lamp-terminals and two of which may be connected at will, either singly or both together, thereby affording three or four different intensities of illumination. I should regard a lamp in which a single continuous length of incandescing material, as in the Edison night-lamp, is separated into two or more sections by means of anchors or conducting-wires as a multifilament-lamp within the meaning of the claims.

I do not wish to be limited by the details of structure shown in the drawings. Obviously these may be widely varied according to the skill of the mechanic.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An incandescent electric lamp comprising an exhausted globe, a plurality of incandescing filaments or sections, a sleeve having an annular ridge adapted to engage the holding device of a socket and constituting one electrical terminal of the lamp, and means operated by the rotation of the lamp for affecting the flow of current to the filaments or to the section of one filament.

2. An incandescent lamp comprising an exhausted globe, a plurality of incandescing filaments or sections of one filament, a cap or base attached to the lamp and independent of the socket having two elements rotatable with respect to each other, and means to hold one of said elements from turning when the lamp is in position in a socket or receptacle, one of said two elements having a pin projecting axially which constitutes an electrical terminal of the lamp.

3. The combination of an exhausted globe, a plurality of incandescing filaments or sections and means operated by the rotation of the lamp for affecting the flow of current to the filaments or to the different sections of one filament with a socket or receptacle comprising the following elements: a series of spring-fingers each terminating in an inward bend or groove adapted to receive the sleeve or base of a lamp, and a central contact adapted to engage a pin or rod projecting axially from the lamp-base, said fingers and said central contact constituting electrical terminals of the socket.

4. A base or cap for an incandescent lamp comprising a sleeve with annular ridge as one electrical terminal, a pin projecting axially as the other terminal and switching mechanism complete as part of said base operated by

the movement of the lamp-bulb with respect to the socket in which it is supported.

5. A base or cap for an incandescent lamp having a sleeve with annular ridge adapted to be grasped by the spring-fingers of a socket or receptacle, means to prevent the rotation of the sleeve when in position in a socket and other parts of said base adapted to revolve within said sleeve.

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