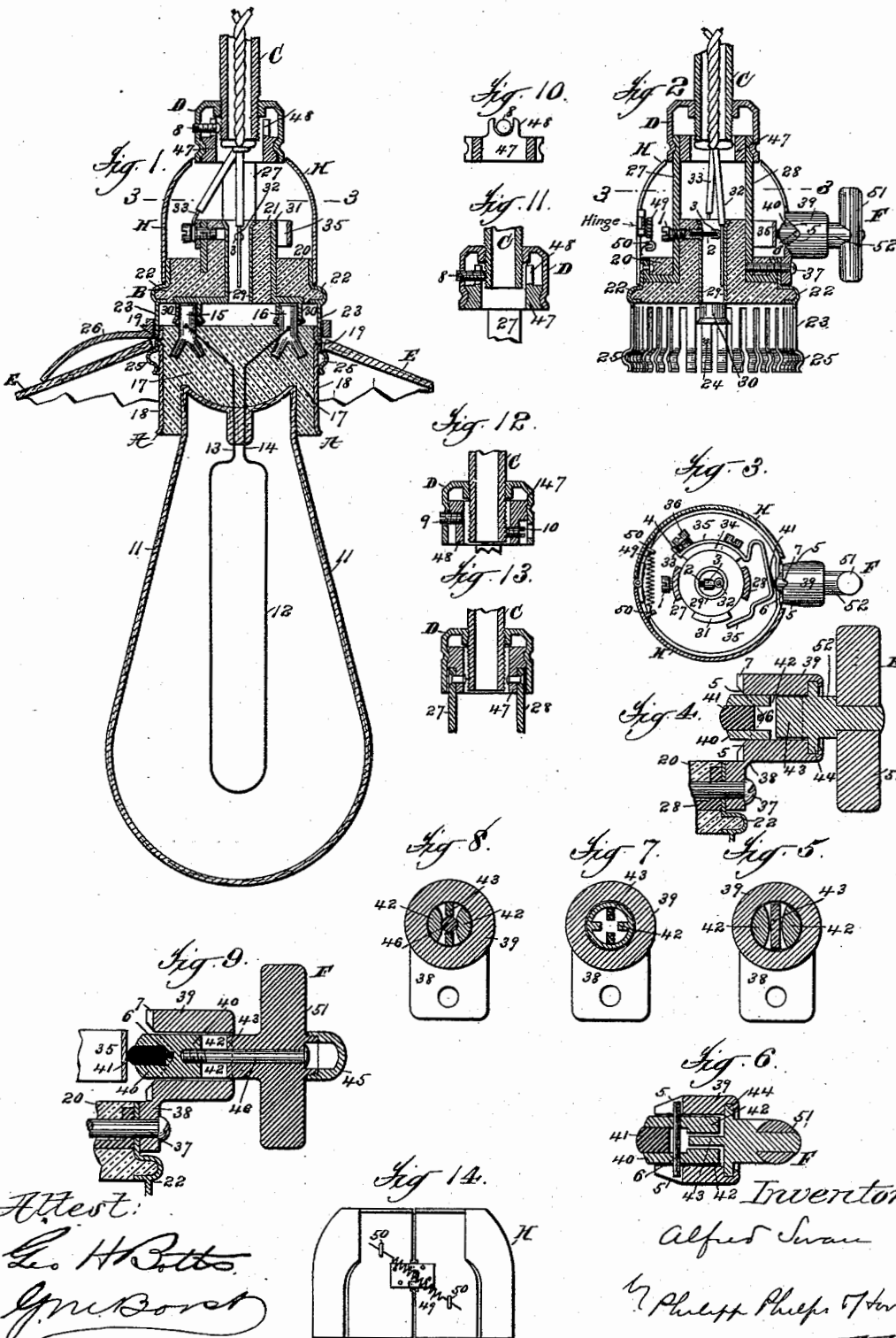


(No Model.)

A. SWAN.  
INCANDESCENT ELECTRIC LAMP SOCKET.

No. 439,366.

Patented Oct. 28, 1890.



Attest:  
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# UNITED STATES PATENT OFFICE.

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## INCANDESCENT-ELECTRIC-LAMP SOCKET.

SPECIFICATION forming part of Letters Patent No. 439,363, dated October 28, 1890.

Application filed June 6, 1890. Serial No. 354,468. (No model.)

*To all whom it may concern:*

Be it known that I, ALFRED SWAN, a subject of the Queen of Great Britain, residing at Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Electric Lamps, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to sockets or holders for incandescent electric lamps, and more particularly to that class of sockets used with lamps known as "individual lamps," or such as are provided with circuit makers and breakers whereby the lamp may be lighted and extinguished.

The object of my invention is to improve the general construction of this class of incandescent-lamp sockets, and to provide a simpler and cheaper socket than those heretofore in use and one which shall permit of more convenient attachment of the line-wires and more ready access to the same and afford a more convenient means of attachment of the lamp and shade.

One of the special objects of my invention is to provide an improved construction of switch by which the circuit is made and broken, which shall avoid the danger of sparking, to which this class of electric lamps is liable.

With these objects in view my invention consists in various constructions and combinations of parts, all of which will be more particularly described in the specification, and pointed out in the claims.

The sockets herein shown and described are the same in some respects as those of my earlier applications, Serial Nos. 301,841 and 301,842, filed March 5, 1889; Serial No. 308,056, filed April 22, 1889; Serial No. 331,808, filed November 27, 1889, and of the application of Thomas G. Roebuck, Serial No. 325,914, filed January 17, 1890; and the invention in the present case consists in part of improvements upon these sockets, which improvements, however, are of general application in this class of construction.

A full description of my invention will now

be given, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a longitudinal section of a complete socket with a lamp and shade attached. Fig. 2 is a longitudinal section of the socket, taken at right angles to Fig. 1. Fig. 3 is a cross-section taken on the line 3 3 of Figs. 1 and 2. Figs. 4, 5, and 6 are detail sections of the switch. Figs. 7, 8, and 9 are detail sections showing modifications of the switch. Figs. 10 and 11 are detail views of the means for attaching the holder to the line-wire carrier. Figs. 12 and 13 show a modification of the same, and Fig. 14 is a detail of the cap for inclosing the socket.

A is the lamp, and B the socket which is connected to the line-wire carrier C by the nozzle D. The lamp A consists of the usual glass flask 11, within which is supported a carbon filament 12, attached to wires 13 14, which extend, respectively, to contact-plugs 15 16, embedded in an insulating-block 17, in which the glass flask is sealed, this insulating-block forming the base of the lamp and being surrounded by a supporting-ring 18, preferably of metal, which is provided with studs or projections 19, by which the lamp is supported in the socket. These projections 19 are preferably formed in the metal of which the ring 18 is made, and may be of any required number to hold the lamp in position.

The socket B consists of a body 20, of sufficient size to support the flange for attachment of the lamp and an extended neck 21, the body and neck being formed of any suitable insulating material, preferably of plastic material, in which the contact and supporting parts may be molded and embedded, as fully set forth in my applications above referred to. The body 20 is surrounded and inclosed in a metallic ring 22, which is extended beyond the body of the socket to form the flange 23, by which the lamp is supported, or this flange may be attached to the body in any other suitable manner. This flange 23 is constructed, as shown, so as to constitute a spring-flange, being cut into blades of suitable width, and is provided with sockets 24, adapted to

receive the projections 19 upon the base of the lamp, these projections and sockets, together with the resiliency of the blades of which the flange is composed, holding the lamp firmly in position. The flange 23 is also adapted to support a shade E, each of the flange-blades being provided near its outer end with a shoulder 25, over which the shade E is sprung into place, the shoulders being formed, preferably, by bending the blades outward, as shown. It is evident that by this construction of a single spring-flange supporting both the lamp and shade—one upon the inside and the other upon the outside of the flange—the lamp and shade are firmly locked in position against accidental displacement, the lamp preventing the blades being sprung inward to release the shade and the shade locking the blades against movement outward to release the lamp. For the purpose of holding the shade E rigidly in position and preventing rattling of the parts a ring provided with spring-fingers 26 is sprung into position upon the flange 23, inside the shade E, the spring-fingers pressing upon the shade and holding it firmly.

Embedded in the body 20, or secured thereto in any other suitable manner, are standards 27 28 upon opposite sides of the socket, to which standards the ring 22 is attached and by which is carried the nozzle D for securing the socket to the line-wire carrier C, the open neck thus formed affording convenient access to the line-wires for purposes of inspection and repair. A contact-tube 29 extends through the center of the socket, and upon the side of the body next the lamp is formed into or connected to a contact-socket 30, which receives the contact-plug 15 carried by the lamp. A similar contact-socket 30 on the opposite side of the body is connected to or formed into contact-piece 31, secured to the side of the neck.

The line-wires 32 33 enter the socket from the line-wire carrier C between the standards 27 28, the line-wire 32 passing direct to a central contact inside the tube 29, the wire being pressed into contact with the side of the tube by means of the contact-screw 1, provided with an insulating-plug 2 and metallic contact-piece 3. The line-wire 33 passes to a contact on the outside of the neck of the lamp, formed by the supporting-piece 34, secured to the neck and carrying the contact-spring 35, the wire 32 being pressed against the contact-spring 35 by means of the screw 36. For the purpose of holding the wire 32 in position and preventing its moving outward from beneath the screw 36 the end of the contact-spring 35 is bent at 4, as shown in Fig. 3, so that the wire is held firmly within the angle formed by the bent portion of the spring. The spring 35 is operated so as to form contact with the contact-piece 31 at the opposite side of the neck, thus closing the circuit between the wires 33 and the contact-plug 16 of the lamp by means of the key F, the contact

being formed by a rubbing action of the spring 35 upon the face of the contact-piece 31.

The construction of the key F is as follows: Secured to the side of the body 20 of the socket, preferably by a screw 37 passing through the standard 28 and the metallic ring 22, as shown, is a post 38, carrying a sleeve 39, within which rotates the key F, this key being composed of two parts. The sleeve 39 is provided on opposite sides with cam-surfaces 5, and within the sleeves 39 slides a stud 40, forming one part of the key, and provided with an insulating-plug 41, which engages the spring or switch arm 35. The stud 40 is provided with a cross-pin 6, upon which the cam-surfaces 5 operate to carry the stud forward against the resiliency of the spring 35 and force the latter into contact with the contact-piece 31 as the stud is rotated in either direction. The sleeve 39 is also provided with notches 7, which are engaged by the cross-pin 6 when the stud 40 is in its forward position, and the latter thus held in position to close the circuit.

The switch construction thus far described with a single-part key is covered by application, Serial No. 308,056, above referred to, and forms no part of the present invention. The present invention relates to an improved construction of switch employing a two-part key.

The rear end of the stud 40 is forked inside the sleeve 39, forming forks 42, and the finger-piece 51, having the shank 52 and forming the other part of the key, is provided with a blade 43, extending between the forks, by which blade the stud 40 is rotated as the key is moved in either direction, the finger-piece and blade being held from longitudinal movement by means of the shoulder 44, over which the sleeve 39 is flanged, as shown clearly in Fig. 4. It will be seen that by this construction the stud 40, engaging and moving the spring, is carried forward by the cam 6 independently of any forward movement of the finger piece and blade, and that upon the rotation of the key in either direction to throw the pin out of the notches 7 the resiliency of the spring 35 will force the stud 40 back to its inner position within the sleeve 39, independently of the finger-piece, the forks 42 of the stud and the blade 43 being so constructed that there is a certain amount of lost motion between the two, enabling the stud to be partially rotated by the cams 6 without engaging the blade. For the purpose of increasing this lost motion I prefer to make the forks 42 convex, as shown in Fig. 5, so as to allow a greater movement of the forks 42 before engaging the blade 43. The same result, however, may evidently be obtained in other ways—as, for instance, by cutting away the central parts of the forks and blade, as shown in Fig. 7. By this construction of key I am able to secure an instantaneous break of the circuit by the rotation of the key, this break being entirely independent of the further movement of the finger-piece, thus avoiding

entirely the danger of sparking, to which this form of lamp is especially liable.

It will be understood that while the cross-pin 6 has been shown as extending through the stud so as to project and engage the cam-surfaces 5 on both sides of the stud, this is not absolutely necessary; but the cross-pin may project only on one side of the key. The construction shown, however, is preferable, as securing a more uniform movement and less strain upon the parts. While I have shown a key that may be rotated through a full circle in either direction, it is evident that my improvements are equally applicable to a key that rotates in but one direction or in one or both directions through a partial circle, and such application is within my invention. The special lost-motion and independent longitudinal-movement features of my two-part key are applicable also to other classes of switch construction than that shown.

A modification of this switch construction is shown in Figs. 8 and 9, in which the finger-piece is provided with a recess 45 within its outer face, adapted to receive the pin 46, secured to and carrying the plug 40, the whole key being free to move longitudinally within the sleeve 39. In this construction the finger-piece and stud 40 move forward together as the stud is rotated by means of the blade 43, the pin 46 connecting the two parts of the key together. When, however, the stud 40 is returned by the spring 35, the pin 46 slides outward into the recess 45, and the stud is returned independently of the operator. In this construction also, as shown in Fig. 8, the forks of the stud are preferably made convex to increase the amount of lost motion.

The line-wire carrier C is shown in the ordinary form of a pipe screw-threaded at its end to which the socket is to be attached, and the standards 27 28 carry at their upper ends a cylindrical block 47, to which is swiveled the nozzle D, the latter being screw-threaded to engage the outside of the line-wire carrier.

A swiveled nozzle attached to and forming a part of an incandescent-lamp socket is described and claimed in the application of T. G. Roebuck, above referred to, and in itself forms no part of the present invention; but my invention includes an improved construction by which the nozzle, the socket, and the line-wire carrier are secured together after attachment has been made, and released for the rotation of the nozzle in removing the socket. In the construction shown in Figs. 1, 10, and 11 the block 47 has one or more shoulders 48, provided with openings, or forked, as shown, and the screw 8 passes through the side of the nozzle D and through the opening in one of the shoulders 48 to engage the line-wire carrier when forced inward. The shoulders are upon the inner sides of the block next the carrier, so as to leave a space between their outer surfaces and the inside of the nozzle. The screw 8 will preferably

be provided with an enlarged inner head, as shown in Fig. 1, to prevent its being withdrawn from the nozzle D. A number of shoulders, or a continuous flanged shoulder provided with a suitable number of openings, may be used; but two shoulders—one on each side of the block, as shown—I have found convenient.

The operation of the construction is as follows: In attaching the socket to the line-wire carrier the screw 8 will be withdrawn from between the forks of the shoulder 48, so that the swiveled nozzle D may be screwed on the line-wire carrier C to the desired extent without rotation of the socket. The screw 8 is then driven inward through the shoulder 48 and against the line-wire carrier C, and thus locks the nozzle to the socket and both to the line-wire carrier, so that the parts are held securely in position against any accidental movement through contact with the lamp or otherwise. The especial advantage of my construction consists in the screw 8 being withdrawn sufficiently to release the nozzle from the socket, while still extending through and inside the nozzle, thus avoiding the danger of removal of the screw from the nozzle. If the screw be provided with the shoulder at its inner end, such removal is impossible; but it is found in practice that this shoulder is not necessary with ordinary cases.

A modified construction is shown in Figs. 12 and 13, in which the shoulders 48 are below the block and form part of the standards by which the socket is supported, and two screws 9 10 are used. The screw 10 passes through an opening in the block, being driven by means of a screw-driver inserted through a corresponding opening in the nozzle, and is adapted to be forced against the line-wire carrier C to lock the block and line-wire carrier together, while the screw 9 passes through the nozzle D and into the block 47, thus locking the block and nozzle together. In using a nozzle of this construction both screws 9 and 10 will be withdrawn, so as to release the nozzle from the block 47 and the latter from the line-wire carrier. The nozzle D having been screwed upon the line-wire carrier, both screws 9 and 10 will be forced inward, so as to lock the parts firmly together. It will be seen that the movement of the screws is very slight, the release of but one part being effected by each screw.

A cap H surrounds the socket, extending from the nozzle D to the ring 22, thus inclosing and protecting the line-wires and switch and contact pieces of the socket. This cap H has previously been constructed to slide over the nozzle D, being put in place prior to the attachment of the nozzle to the line-wire carrier. In order therefore to permit of the cap H being withdrawn over the nozzle and line-wire carrier a sufficient distance to permit of inspecting and repairing the line-wires and contacts, the line-wire carrier has necessarily been extended a considerable distance from

the wall or ceiling of the room from which it projects. This is frequently inconvenient, especially in lamps supported in the wall, and one object of my invention is to provide a cap by the use of which the line-wires and contacts may be readily inspected and the socket be placed close to the support. For this purpose I form the cap H in two parts, as shown in Fig. 14, these parts being hinged so as to open and close in a plane transverse to the socket, and held normally closed by means of a spring 49, attached to studs 50 on the inside of the cap, the sections of the cap thus being held together, while permitting them to be readily opened for removal of the cap from the socket.

While I have shown and described specific constructions embodying my invention, it will be understood that the constructions shown may be varied in details by one skilled in the art without departing from my invention.

What I claim is—

1. In a switch, the combination, with the circuit-closing devices and a spring for breaking the circuit, of a sleeve having cam-surfaces, and a key rotating within said sleeve and formed in two parts, one part being provided with a cross-pin engaging said cam-surfaces and having a longitudinal movement independent of the other part when returned by the circuit-breaking spring, the key being constructed with lost motion between the two parts in their rotary movement, substantially as described.

2. In a switch, the combination, with circuit-closing devices and a spring for breaking the circuit, of the rotating key formed in two parts and cam-surfaces engaged by one part on the rotation of the key and by which said part is advanced longitudinally for closing the circuit, said part having a longitudinal movement independent of the other part when returned by the circuit-breaking spring, and the key being constructed with lost motion between the two parts in their rotary movement, substantially as described.

3. The combination, with a spring switch-arm closing and breaking the circuit, of a sleeve having cam-surfaces, and a key rotating within said sleeve and formed in two parts, one part being provided with a cross-pin engaging said cam-surfaces and by which it operates the spring switch-arm in one direction and having a longitudinal movement independent of the other part when returned by the spring switch-arm, the key being constructed with lost motion between the two parts in their rotary movement, substantially as described.

4. The combination, with a spring switch-arm closing and breaking the circuit, of a rotating key formed in two parts and means whereby the rotation of the key advances one part longitudinally for operating the spring switch-arm to close the circuit, said part having a longitudinal movement independently of the other part when returned by the spring

switch-arm and the key being constructed with lost motion between the two parts in their rotary movement, substantially as described.

5. The combination of the sleeve 39, having cam-surfaces 5, the stud 40, having cross-pin 6, the spring switch-arm 35, engaged by the stud in its forward movement and effecting the return of the stud, and finger-piece 51 for rotating said stud, the stud and finger-piece being constructed with lost motion between them in their rotary movement and to permit of the longitudinal return movement of the stud independent of the finger-piece, substantially as described.

6. The combination of the sleeve 39, having cam-surfaces 5, the stud 40, having cross-pin 6, the spring switch-arm 35, engaged by the stud in its forward movement and effecting the return of the stud, and finger-piece 51 for rotating said stud, said finger-piece being held from longitudinal movement and the stud and finger-piece being constructed with lost motion between them in their rotary movement, substantially as described.

7. The combination of the sleeve 39, having cam-surfaces 5 and notches 7, stud 40, having cross-pin 6 and forks 42, and finger-piece 51, having blade 43 extending between said forks, the blade and forks being constructed with lost motion between them in their rotary movement, substantially as described.

8. The combination, with a lamp-socket having a spring-flange provided with independent supports on its inner and outer faces, of a lamp and shade sprung into position and held by the supports, one on the inside and the other on the outside of the flange, substantially as described.

9. The combination, with the socket B, having the spring-flange 23, provided with interior recesses 24 and with an exterior shoulder 25, of the lamp A, having projections 19 engaging said recesses, and the shade E, sprung over said shoulder, substantially as described.

10. The combination, with the line-wire carrier C and socket B, of the block 47, carried by the socket and having an inner shoulder or shoulders 48, swiveled nozzle D, and a screw locking the nozzle and shoulder together, substantially as described.

11. The combination, with the line-wire carrier C and socket B, of the block 47, carried by the socket and having an inner shoulder or shoulders 48, swiveled nozzle D, and a screw passing through the coupling-piece and shoulder and pressing against the line-wire carrier, substantially as described.

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

ALFRED SWAN.

Witnesses:

T. H. PALMER,  
THOMAS F. KEHOE.