

June 27, 1944.

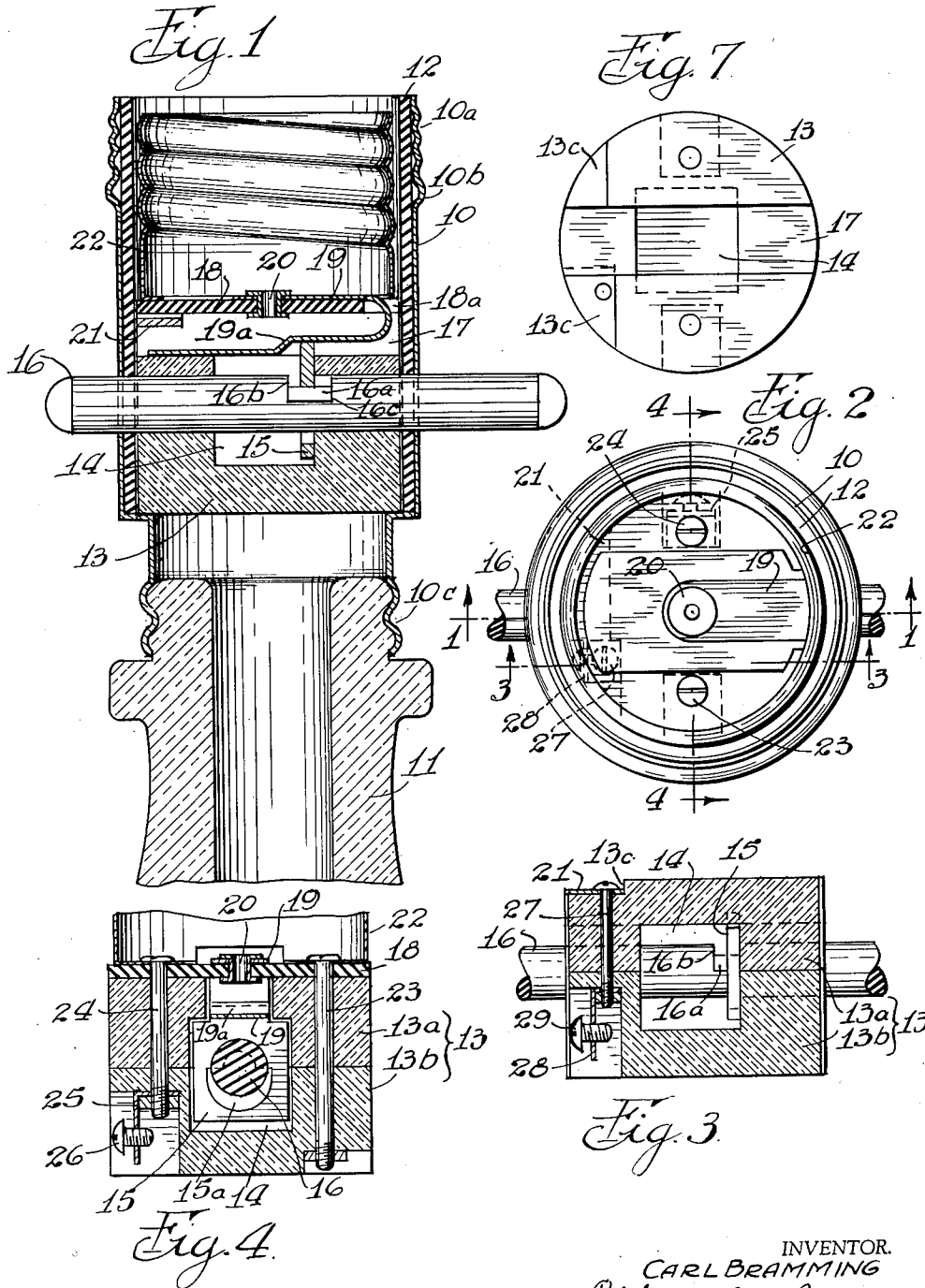
C. BRAMMING

2,352,248

LAMP SOCKET AND SWITCH CONSTRUCTION

Filed June 11, 1942

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 8.

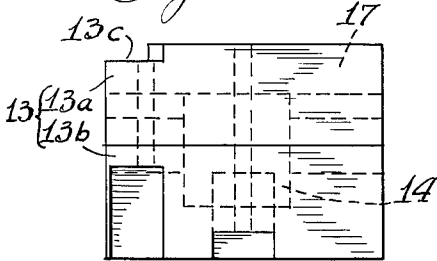


Fig. 9.

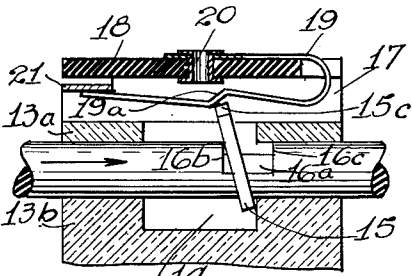
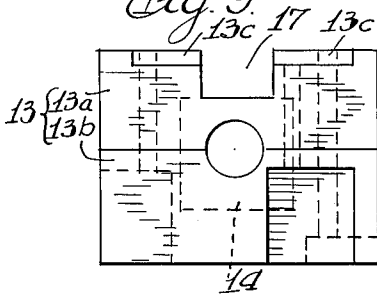


Fig. 14

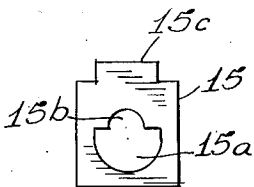
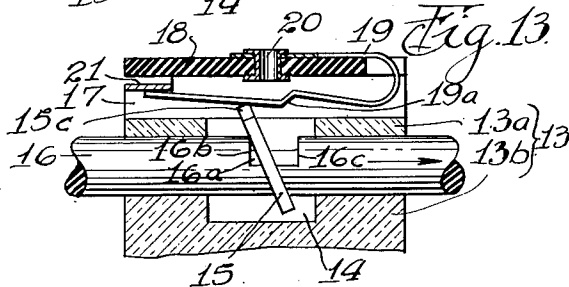
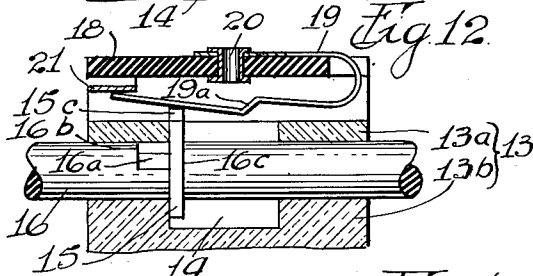
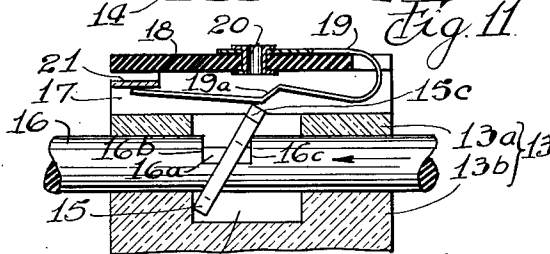
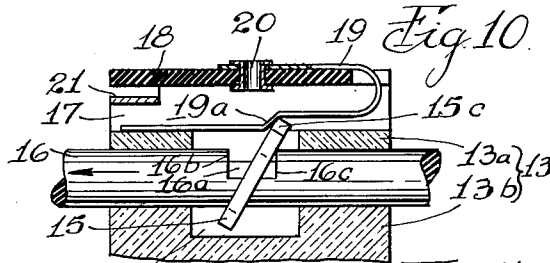
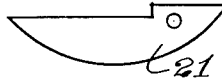


Fig. 5

Fig. 6.



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UNITED STATES PATENT OFFICE

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LAMP SOCKET AND SWITCH
CONSTRUCTIONCarl Bramming, Anderson, Ind., assignor to The
Mantle Lamp Company of America, Chicago,
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Application June 11, 1942, Serial No. 446,562

14 Claims. (Cl. 200—51.16)

The invention pertains to an improved electric lamp socket and switch construction by which the cost of construction is much reduced, and the structure is simplified without interfering in any way with the positive action of the switch mechanism, the structure of the invention being durable and reliable to a high degree.

The switch mechanism of the invention is of the push rod type, the push rod being mounted for free sliding movement in the ceramic base of the socket, which ceramic base is provided with a recess for loosely containing a flat operating plate movable with the push rod in closing and opening the switch, the plate being loosely supported by the push rod so that the rod has limited movement relatively to the plate. The plate engages a cam surface on the switch spring of the structure, so that movement of the plate in one direction closes the switch, and movement of the plate in the opposite direction by the push rod opens the switch and at the same time provides a quick release of the switch spring from the operating plate, producing a correspondingly quick break in the circuit controlled by the switch.

The invention further provides a construction of the push rod and operating plate such that operative relation between the push rod and the plate may be interrupted by turning the push rod through substantially one-half a turn, for which position of the parts the push rod may be completely withdrawn from the socket construction, to permit removing the ceramic base and parts carried thereby from the insulating tube of the socket construction for conductor connecting purposes. The removability of the push rod also facilitates assembling the socket structure since the push rod may be inserted into the opening therefor in the base and pushed through the operating plate to assemble the parts of the socket structure, after which by turning the push rod through about one-half a turn, the operative relation of the plate and push rod is again established.

The invention will be best understood by reference to the accompanying drawings illustrating a preferred embodiment thereof in which:

Fig. 1 is a vertical, central, sectional view through the socket structure in the plane of the push rod, this view being taken along the line 1—1 in Fig. 2,

Fig. 2 is a plan view of the structure shown in Fig. 1,

Fig. 3 is a vertical, sectional view through the ceramic base, taken along the line 3—3 in Fig. 2,

Fig. 4 is a vertical, sectional view through the

ceramic base of the structure, taken along the line 4—4 in Fig. 2,

Fig. 5 shows in elevation the operating plate,

Fig. 6 is a plan view of the contact plate employed in connection with the switch spring of the device,

Fig. 7 is a plan view of the ceramic base with the parts supported thereby removed,

Fig. 8 is a side elevation of the ceramic base in the direction shown in Fig. 1,

Fig. 9 is a side elevation of the ceramic base of the structure at right angles to that shown in Fig. 8,

Fig. 10 is a vertical, sectional view through the ceramic base in the plane of the push rod, illustrating the beginning of the closing movement of the switch,

Fig. 11 is a view similar to Fig. 10 illustrating the completion of the closing movement of the switch,

Fig. 12 is a view similar to Figs. 10 and 11 showing the operating plate in its complete movement by the push rod to its switch closing position,

Fig. 13 is a view similar to Figs. 10–12 inclusive, showing the beginning of the switch opening movement of the operating plate, and

Fig. 14 is a view similar to Figs. 10–13 inclusive, showing the operating plate in its position immediately preceding release from the switch spring permitting the quick opening of the switch.

Similar numerals refer to similar parts through the several views.

As shown in Figs. 1 and 2, the switch structure consists of an external metal shell 10 of tubular form provided with upper end threads 10a for supporting a shade ring and with an enlarged bead 10b for limiting movement of the said ring onto the shell 10. The other end of the shell 10 is continued at its lower end and provided with coarse threads 10c for directly engaging corresponding threads on the upper end of a supporting standard 11 which may for example be of glass or ceramic material if desired in connection with small portable lamp stands such as boudoir lamps. The shell 10 contains a tubular liner 12 of insulating material which closely fits it and inside of the liner 12 and in its lower portion, a cylindrical socket base 13 of ceramic material is disposed with a loose fit permitting its ready insertion into and removal from the liner 12. The base 13 is provided with a central recess 14 generally cubical in form, to receive an operating plate 15, and a push rod 16 of insulating material, is horizontal-

ly disposed for free reciprocating movement in a corresponding bore in the base 13, said rod also extending through an aperture therefor in the plate 15. The base 13 is provided at its upper portion with a channel 17 opening through its upper surface and substantially parallel with the rod 16, which channel is in open communication with the top of the recess 14. The base 13 supports on its upper surface a circular plate 18 of insulating material to which one end of a switch spring 19 is centrally connected, for example by a rivet 20. The switch spring 19 extends radially from the rivet 20 and adjacent the edge of the plate 18 said spring is bent downwardly and into the channel 17, in which it extends under the rivet 20 and nearly across the base 13, a clearance notch 18a being provided in the plate 18 to receive said spring. The switch spring 19 is provided in the channel 17 and above the recess 14, with a cam portion 19a for engagement by the upper edge of the plate 15 so that movement of the plate by operation of the rod 16 will move the free end of the switch spring 19 to its circuit closing position. Above the free end of the spring 19, the base 13 supports a contact plate 21 extending across the channel 17 for electrical engagement with the free end of the switch spring 19 when the switch is closed, and spaced sufficiently from the free end of the switch spring when the switch is open, to meet all safety requirements. In its open position, the free end of the switch spring 19 presses firmly against the bottom of the channel 17.

The insulating plate 18 supports an internally threaded metal shell 22 inside of the liner 12, for engaging the corresponding threads on a lamp bulb base so that the shell 22 and the rivet 20 will constitute contacts for supplying current to the bulb when it is in place in the lamp socket.

The inner shell 22, the insulating plate 18 and the base 13 are rigidly secured together in assembled relation by suitable screws 23 and 24 as shown in Fig. 4, the screw 23 being simply a clamping screw and the screw 24 being in addition, a circuit connecting screw and provided with a terminal clip 25 and binding screw 26 at its lower end. As shown in Fig. 4, the base 13 comprises upper and lower portions 13a and 13b parted in a horizontal plane extending through the rod 16, to facilitate assembling the structure. Suitable recesses are provided in the lower base portion 13b to receive the nuts on the screws 23 and 24 and also the connector clip 25, within the inner surface of the liner 12.

As shown in Fig. 3 the upper base portion 13a is provided with an upper edge recess 13c to receive the contact plate 21, which plate 21 is held securely in the recess 13c and in a position extending across the channel 17, by a screw 27 secured at its lower end to a terminal clip 28 provided with a binding screw 29, which clip and binding screw are contained in a suitable recess therefor in the lower base portion 13b within the inner surface of the liner 12. The recess 13c is of sufficient depth to avoid interference between the screw 27 and the insulating plate 18.

As shown in Fig. 5, the operating plate 15 is provided with an aperture 15a, the lower portion of which is of sufficient size to clear the outer surface of the operating rod 16. The upper portion of the aperture 15a is semi-circular and of reduced radius as shown at 15b to loosely fit a correspondingly shaped semi-cylindrical portion

16a of the push rod 16 contained between shoulders 16b and 16c forming the end walls of a notch in the push rod to receive the upper portion of the operating plate 15 when in its operative relation to the push rod. The portion 16a of the push rod cooperating with the similarly formed portion 15b of the aperture 15a in the plate 15, serves to center the plate 15 transversely of the rod 16 in the recess 14 so as to prevent engagement between the edges of the plate and the walls of the recess, and the depth of the plate 15 below the aperture 15a is such that the lower edge of the plate is disposed sufficiently above the bottom of the recess 14 to prevent engagement between the plate and the recess bottom. The plate 15 extends above the recess 14 and sufficiently into the channel 17, by means of the portion 15c (Fig. 5) to be closely adjacent to the switch spring 19 to the right of its cam portion 19a, when the free end of the switch spring rests on the bottom of the channel 17 as shown in Fig. 1.

As a result of the construction described, when the push rod 16 is moved to close the switch, as illustrated by the arrow in Fig. 10, the upper edge of the operating plate 15 engages the cam portion 19a of the switch spring 19, which holds the upper portion of the plate 15 against movement until the shoulder 16c engages said plate and tilts the same as illustrated in Fig. 10, to engage the bottom of the aperture 15a with the rod 16. After this relation of the operating plate 15 is established, continued movement of the rod 16 in the direction of the arrow in Fig. 10, raises the free end of the switch spring 19 by the action of its cam portion 19a, which continues until the parts assume the position shown in Fig. 11, when the upper edge of the plate 15 has passed just beyond the cam portion 19a of the switch spring, at which time the free end of the switch spring is pressed firmly into electrical contact with the contact plate 21, thereby closing the circuit from the terminal clip 28 to the central contact of the bulb in the lamp socket. In closing the switch, the operator does not stop with the operating plate 15 in the position illustrated in Fig. 11, but moves the rod 16 as far as it will go, which by the action of the wall of the recess 14 and the shoulder 16c, moves the plate 15 into an upright position in which it may effectively begin the opening of the switch by reverse movement of the rod 16. Although the full movement of the plate 15 to the position indicated in Fig. 12 will usually occur in the natural operation of the closing of the switch, it is to be borne in mind that the switch opening operation is quite as effectively performed, whether the beginning of the operating movement is with the operating plate 15 in its extreme position shown in Fig. 12 or in an intermediate position illustrated in Fig. 13, as long as the upper edge of the operating plate is to the left as illustrated in these figures, of the cam portion 19a of the switch spring 19.

With the operating plate to the left of the cam portion 19a, as illustrated in Figs. 12 and 13, movement of the rod 16 to the right, slides the rod through the operating plate 15 until the shoulder 16b engages said operating plate, movement to the right of the operating plate being prevented during this interval by the engagement of the upper edge of the operating plate with the stressed switch spring 19. The result is a tilting of the operating plate 15 in the direction shown in Fig. 13, which inclination of the

operating plate continues until movement of the rod 16 has moved the upper edge of the plate 15 just into engagement with the cam portion 19a of the switch spring 19 as shown in Fig. 14, at which time, as illustrated in Fig. 14, the amount of inclination of the plate 15 shown in Fig. 13, has been substantially reduced by the engagement of the lower edge of the operating plate 15 with the wall of the recess 14. With the parts in the position shown in Fig. 14 the tension on the switch spring 19 moves the cam surface 19a downwardly and very rapidly against the upper edge of the plate 15, throwing the upper portion of the plate 15 to the right and completely freeing the switch spring 19 from the lifting effect exerted by the operating plate 15, which affords a correspondingly rapid separation of the free end of the switch spring 19 from the contact plate 21, thereby effecting a quick break of the lamp circuit, which restores the operating plate 15 to substantially the position illustrated in Fig. 1.

The construction described is economical to manufacture because the ceramic base may be readily molded so that it is in condition for assembly as it leaves the molds, and the metal parts of the structure may be readily formed by simple and inexpensive punch press operations. At the same time, the operation of the switch is positive and reliable. The construction described has the further advantage that the socket structure as a whole when made for use with pedestals or standards of the type illustrated in Fig. 1, is relatively short because of the only separation between the upper end of the support or pedestal and the lower surface of the ceramic base of the switch structure, being that required to contain the electrical conductors extending from the pedestal to the terminal clips of the socket structure.

While I have shown my invention in the particular embodiment above described, I do not limit myself thereto as I may employ equivalents thereof without departing from the scope of the appended claims.

Having thus described my invention, what I claim is:

1. In an electric lamp socket, the combination of a tubular shell, a cylindrical base of insulating material in the lower end of said shell, said base having a channel opening through and extending across its upper end and having also a cubical recess below and opening into said channel, an operating rod of insulating material extending laterally through said shell and said base and also through said recess for reciprocable movement, a disk of insulating material on the upper end of said base, a switch spring mounted on said disk and extending longitudinally of said channel and adjacent the bottom thereof, a contact plate supported by said base and crossing said channel above the free end of said switch spring and spaced from said free end for the open condition of the switch, said switch spring having a vertically operable cam portion above said recess, and a rectangular operating plate vertically disposed in said recess and having an aperture therethrough containing said operating rod, said operating plate extending into said channel to engage and operate said cam portion, and said operating rod having shoulders for engaging and moving said operating plate through said recess, whereby longitudinal movement of said operating rod moves the free end of said switch spring into contact with said contact plate

and permits spring movement of said free end away from said contact plate as desired to control the closing and opening of the switch.

2. In an electric lamp socket, the combination of a tubular shell, a cylindrical base of insulating material in the lower end of said shell, said base having a channel opening through and extending across its upper end and having also a cubical recess below and opening into said channel, an operating rod of insulating material extending laterally through said shell and said base and also through said recess for reciprocable movement, a disk of insulating material on the upper end of said base, a switch spring mounted on said disk and extending longitudinally of said channel and adjacent the bottom thereof, a contact plate supported by said base and crossing said channel above the free end of said switch spring and spaced from said free end for the open condition of the switch, said switch spring having a vertically operable cam portion above said recess, and a rectangular operating plate vertically disposed in said recess and having an aperture therethrough containing said operating rod, said operating plate extending into said channel to engage and operate said cam portion, and said operating rod having shoulders for engaging and moving said operating plate through said recess, whereby longitudinal movement of said operating rod moves the free end of said switch spring into contact with said contact plate and permits spring movement of said free end away from said contact plate as desired to control the closing and opening of the switch, said operating rod having an outer cylindrical surface and said shoulders being contained within said surface, the aperture in said operating plate being of a size clearing said cylindrical surface, and said shoulders being restricted to the upper half of said operating rod, whereby by turning said operating rod through a one-half rotation said rod may be withdrawn from said shell and said base for dismantling purposes.

3. In an electric lamp socket, the combination of a tubular shell, a cylindrical base of insulating material in the lower end of said shell, said base having a channel opening through and extending across its upper end and having also a cubical recess below and opening into said channel, an operating rod of insulating material extending laterally through said shell and said base and also through said recess for reciprocable movement, a disk of insulating material on the upper end of said base, a switch spring mounted on said disk and extending longitudinally of said channel and adjacent the bottom thereof, a contact plate supported by said base and crossing said channel above the free end of said switch spring and spaced from said free end for the open condition of the switch, said switch spring having a vertically operable cam portion above said recess, and a rectangular operating plate vertically disposed in said recess and having an aperture therethrough containing said operating rod, said operating plate extending into said channel to engage and operate said cam portion, and said operating rod having shoulders for engaging and moving said operating plate through said recess, whereby longitudinal movement of said operating rod moves the free end of said switch spring into contact with said contact plate and permits spring movement of said free end away from said contact plate as desired to control the closing and opening of the switch, said shoulders being spaced from said operating plate,

whereby switch-closing movement of said operating rod tilts said operating plate at an inclination effectively operating said cam portion.

4. In an electric lamp socket, the combination of a tubular shell, a cylindrical base of insulating material in the lower end of said shell, said base having a channel opening through and extending across its upper end and having also a cubical recess below and opening into said channel, an operating rod of insulating material extending laterally through said shell and said base and also through said recess for reciprocable movement, a disk of insulating material on the upper end of said base, a switch spring mounted on said disk and extending longitudinally of said channel and adjacent the bottom thereof, a contact plate supported by said base and crossing said channel above the free end of said switch spring and spaced from said free end for the open condition of the switch, said switch spring having a vertically operable cam portion above said recess, and a rectangular operating plate vertically disposed in said recess and having an aperture therethrough containing said operating rod, said operating plate extending into said channel to engage and operate said cam portion, and said operating rod having shoulders for engaging and moving said operating plate through said recess, whereby longitudinal movement of said operating rod moves the free end of said switch spring into contact with said contact plate and permits spring movement of said free end away from said contact plate as desired to control the closing and opening of the switch, said shoulders being spaced from said operating plate inclining said operating plate on said rod for switch-opening movement of said rod, and said recess walls and said cam portion having a relation quickly freeing said operating plate from said cam portion and quickly effecting the separation of said switch spring from said contact plate.

5. In an electric lamp socket, the combination of a tubular shell, a cylindrical base of insulating material in the lower end of said shell, said base having a channel opening through and extending across its upper end and having also a cubical recess below and opening into said channel, an operating rod of insulating material extending laterally through said shell and said base and also through said recess for reciprocable movement, a disk of insulating material on the upper end of said base, a switch spring mounted on said disk and extending longitudinally of said channel and adjacent the bottom thereof, a contact plate supported by said base and crossing said channel above the free end of said switch spring and spaced from said free end for the open condition of the switch, said switch spring having a vertically operable cam portion above said recess, and a rectangular operating plate vertically disposed in said recess and having an aperture therethrough containing said operating rod, said operating plate extending into said channel to engage and operate said cam portion, and said operating rod having shoulders for engaging and moving said operating plate through said recess, whereby longitudinal movement of said operating rod moves the free end of said switch spring into contact with said contact plate and permits spring movement of said free end away from said contact plate as desired to control the closing and opening of the switch, said shoulders being spaced from said operating plate, whereby switch-closing movement of said oper-

ating rod tilts said operating plate in a first direction and at an inclination effectively operating said cam portion, and switch-opening movement of said rod tilts said operating plate in the reverse direction, said recess walls and said cam portion having a relation quickly freeing said operating plate from said cam portion and quickly effecting the separation of said switch spring from said contact plate during the latter part of the switch-opening movement of said operating rod.

6. In an electric lamp socket, the combination of a tubular shell, a cylindrical base of insulating material in the lower end of said shell, said base having a channel opening through and extending across its upper end and having also a cubical recess below and opening into said channel, an operating rod of insulating material extending laterally through said shell and said base and also through said recess for reciprocable movement, a disk of insulating material on the upper end of said base, a switch spring mounted on said disk and extending longitudinally of said channel and adjacent the bottom thereof, a contact plate supported by said base and crossing said channel above the free end of said switch spring and spaced from said free end for the open condition of the switch, said switch spring having a vertically operable cam portion above said recess, and a rectangular operating plate vertically disposed in said recess and having an aperture therethrough containing said operating rod, said operating plate extending into said channel to engage and operate said cam portion, and said operating rod having shoulders for engaging and moving said operating plate through said recess, whereby longitudinal movement of said operating rod moves the free end of said switch spring into contact with said contact plate and permits spring movement of said free end away from said contact plate as desired to control the closing and opening of the switch, said tubular shell being extended below said cylindrical base and having integral attachment threads for engaging the threaded end of a pedestal.

7. In an electric lamp socket, the combination of a tubular shell, a switch operating rod extending laterally through said shell for reciprocable movement, a switch operating plate loosely carried by said rod in a plane extending transversely of said rod and having an opening through which said rod extends for longitudinal movement relatively to said plate, a switch spring having operative relation with said operating plate, and a contact plate cooperating with said switch spring to control the opening and closing of the socket circuit, said tubular shell being open at one end to receive a lamp bulb and drawn out at its other end and formed into integral attachment threads for engaging the threaded end of a pedestal.

8. Switching means for an electric lamp socket, including in combination a base having a recess and a rod-supporting bore in a direction crossing said recess, a switch-operating flat plate loosely contained in said recess and having an aperture through it in line with said bore, a push rod mounted in said bore for reciprocable axial movement and extending across said recess and through said plate aperture, said plate aperture being substantially larger than the rod portion engaged by said plate and loosely supporting said plate on said rod for free movement relatively to and axially of said rod and for free

tilting movement on said rod, said plate being free from connection with said rod and with said base, a switch spring mounted to extend substantially in the direction of said rod and pressing against the edge of said plate and having an operating cam in line with said recess, and a switch contact cooperating with said switch spring, said rod having spaced shoulders on opposite sides of said plate limiting axial movement of said rod relatively to said plate, whereby movement of said rod axially in one direction tilts said plate in a first direction and by engagement of said plate with said operating cam moves said switch spring into engagement with said switch contact and axial movement of said rod in the opposite direction tilts said plate in a second direction and then by engagement with said operating cam by the spring action of said switch spring throws said plate to its first direction of tilting thereby freeing said operating cam from said plate and quickly separating said switch spring from said switch contact.

9. Switching means for an electric lamp socket, including in combination a base having a recess and a rod-supporting bore in a direction crossing said recess, a switch-operating flat plate loosely contained in said recess and having an aperture through it in line with said bore, a push rod mounted in said bore for reciprocable axial movement and extending across said recess and through said plate aperture, said plate aperture being substantially larger than the rod portion engaged by said plate and loosely supporting said plate on said rod for free movement relatively to and axially of said rod and for free tilting movement on said rod, said plate being free from connection with said rod and with said base, a switch spring mounted to extend substantially in the direction of said rod and pressing against the edge of said plate and having an operating cam in line with said recess, and a switch contact cooperating with said switch spring, said rod having spaced shoulders on opposite sides of said plate limiting axial movement of said rod relatively to said plate, whereby movement of said rod axially in one direction tilts said plate in a first direction and by engagement of said plate with said operating cam moves said switch spring into engagement with said switch contact and axial movement of said rod in the opposite direction tilts said plate in a second direction and then by engagement with said operating cam by the spring action of said switch spring throws said plate to its first direction of tilting thereby freeing said operating cam from said plate and quickly separating said switch spring from said switch contact, said operating rod having an outer cylindrical surface and containing said shoulders within said surface, and said shoulders being restricted to one side of said rod, whereby by turning said operating rod said rod may be withdrawn from said plate for dismantling purposes.

10. Switching means for an electric lamp socket, including in combination a base having a recess and a rod-supporting bore in a direction crossing said recess, a switch-operating flat plate loosely contained in said recess and having an aperture through it in line with said bore, a push rod mounted in said bore for reciprocable axial movement and extending across said recess and through said plate aperture, said plate aperture being substantially larger than the rod portion engaged by said plate and loosely supporting said plate on said rod for free movement rela-

tively to and axially of said rod and for free tilting movement on said rod, said plate being free from connection with said rod and with said base, a switch spring mounted to extend substantially in the direction of said rod and pressing against the edge of said plate and having an operating cam in line with said recess, and a switch contact cooperating with said switch spring, said rod having spaced shoulders on opposite sides of said plate limiting axial movement of said rod relatively to said plate, whereby movement of said rod axially in one direction tilts said plate in a first direction and by engagement of said plate with said operating cam moves said switch spring into engagement with said switch contact and axial movement of said rod in the opposite direction tilts said plate in a second direction and then by engagement with said operating cam by the spring action of said switch spring throws said plate to its first direction of tilting thereby freeing said operating cam from said plate and quickly separating said switch spring from said switch contact, said operating rod having an outer cylindrical surface and containing said shoulders within said surface, and said shoulders being restricted to one side of said rod, whereby by turning said operating rod said rod may be withdrawn from said plate for dismantling purposes, said rod having a flat portion between said shoulders and said plate being correspondingly shaped in engagement with said flat portion, thereby under the action of said switch spring resiliently restraining said rod against turning movement.

11. Switching means for an electric lamp socket, including in combination a base having a recess and a rod-supporting bore in a direction crossing said recess, a switch-operating flat plate loosely contained in said recess and having an aperture through it in line with said bore, a push rod mounted in said bore for reciprocable axial movement and extending across said recess and through said plate aperture, said plate aperture being substantially larger than the rod portion engaged by said plate and loosely supporting said plate on said rod for free movement relatively to and axially of said rod and for free tilting movement on said rod, said plate being free from connection with said rod and with said base, a switch spring mounted to extend substantially in the direction of said rod and pressing against the edge of said plate and having an operating cam in line with said recess, and a switch contact cooperating with said switch spring, said rod having spaced shoulders on opposite sides of said plate limiting axial movement of said rod relatively to said plate, whereby movement of said rod axially in one direction tilts said plate in a first direction and by engagement of said plate with said operating cam moves said switch spring into engagement with said switch contact and axial movement of said rod in the opposite direction tilts said plate in a second direction and then by engagement with said operating cam by the spring action of said switch spring throws said plate to its first direction of tilting thereby freeing said operating cam from said plate and quickly separating said switch spring from said switch contact, the opposite walls of said recess and said shoulders limiting reciprocating movement of said operating rod and effecting movement of said plate on said rod from a tilted position to a position substantially perpendicular to said rod.

12. Electric switching means including in

combination a base having spaced bearings supporting a rod for reciprocable movement, a switch-operating plate in a plane crossing said rod and loosely supported on said rod between said bearings for free movement on said rod, said plate being free from connection with said rod and having a first position on said rod for closing the switch and a second and different position on said rod for opening the switch, and an electric switch including a switch spring and a switch contact, said switch spring being mounted to extend substantially in the direction of said rod and pressing against the edge of said plate and having an operating cam in line with the space between said bearings, said rod having spaced shoulders on opposite sides of said plate limiting axial movement of said plate relatively to said rod, whereby movement of said rod axially in one direction moves said plate to its switch-closing position on said rod and by engagement of said plate with said operating cam moves said switch spring into engagement with said switch contact and axial movement of said rod in the opposite direction moves said plate to its switch-opening position on said rod and then by engagement with said operating cam by the spring action of said switch spring throws said plate to its said first position thereby freeing said operating cam from said plate and quickly separating said switch spring from said switch contact.

13. Electric switching means including in combination a base having spaced bearings supporting a rod for reciprocable movement, a switch-operating plate in a plane crossing said rod and loosely supported on said rod between said bearings for free movement on said rod, said plate being free from connection with said rod and having a first position on said rod for closing the switch and a second and different position on said rod for opening the switch, and an electric switch including a switch spring and a switch contact, said switch spring being mounted to extend substantially in the direction of said rod and pressing against the edge of said plate and having an operating cam in line with the space between said bearings, said rod having spaced shoulders on opposite sides of said plate limiting axial movement of said plate relatively to said rod, whereby movement of said rod axially in one direction moves said plate to its switch-closing position on said rod and by engagement of said plate with said operating cam moves said switch spring into engagement with said switch contact and axial movement of said rod in the opposite direction moves said plate to its switch-opening position on said rod and

then by engagement with said operating cam by the spring action of said switch spring throws said plate to its said first position thereby freeing said operating cam from said plate and quickly separating said switch spring from said switch contact, said operating rod having an outer cylindrical surface and containing said shoulders within said surface, and said shoulders being restricted to one side of said rod, whereby by turning said operating rod said rod may be withdrawn from said plate for dismantling purposes.

14. Electric switching means including in combination a base having spaced bearings supporting a rod for reciprocable movement, a switch-operating plate in a plane crossing said rod and loosely supported on said rod between said bearings for free movement on said rod, said plate being free from connection with said rod and having a first position on said rod for closing the switch and a second and different position on said rod for opening the switch, and an electric switch including a switch spring and a switch contact, said switch spring being mounted to extend substantially in the direction of said rod and pressing against the edge of said plate and having an operating cam in line with the space between said bearings, said rod having spaced shoulders on opposite sides of said plate limiting axial movement of said plate relatively to said rod, whereby movement of said rod axially in one direction moves said plate to its switch-closing position on said rod and by engagement of said plate with said operating cam moves said switch spring into engagement with said switch contact and axial movement of said rod in the opposite direction moves said plate to its switch-opening position on said rod and then by engagement with said operating cam by the spring action of said switch spring throws said plate to its said first position thereby freeing said operating cam from said plate and quickly separating said switch spring from said switch contact, said operating rod having an outer cylindrical surface and containing said shoulders within said surface, and said shoulders being restricted to one side of said rod, whereby by turning said operating rod said rod may be withdrawn from said plate for dismantling purposes, said rod having a flat portion between said shoulders and said plate being correspondingly shaped in engagement with said flat portion, thereby under the action of said switch spring resiliently restraining said rod against turning movement.

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