

June 13, 1950

A. A. F. BEDOISEAU
SOCKET FOR ELECTRIC LAMPS

2,511,037

Filed Feb. 5, 1947

2 Sheets-Sheet 1

FIG. 1.

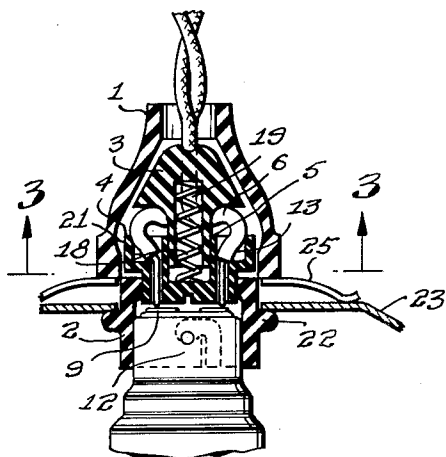


FIG. 2.

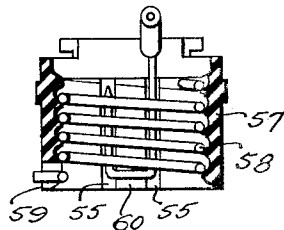
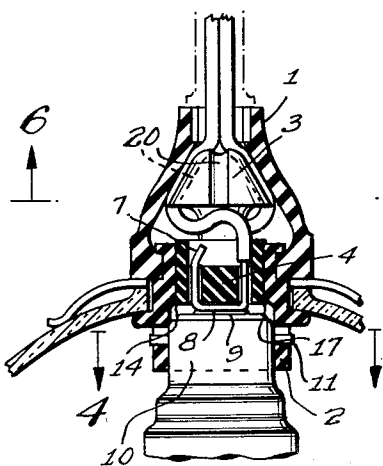


FIG. 7.

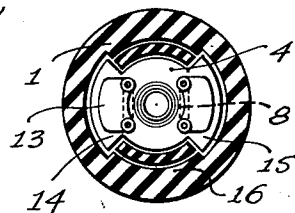
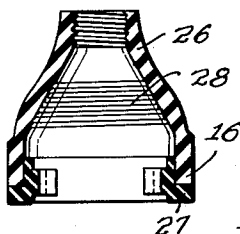


FIG. 3.

FIG. 4.

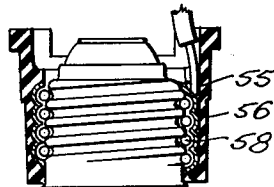
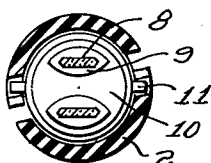


FIG. 13.

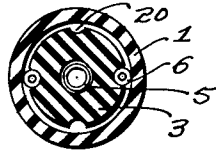


FIG. 6.

FIG. 5.

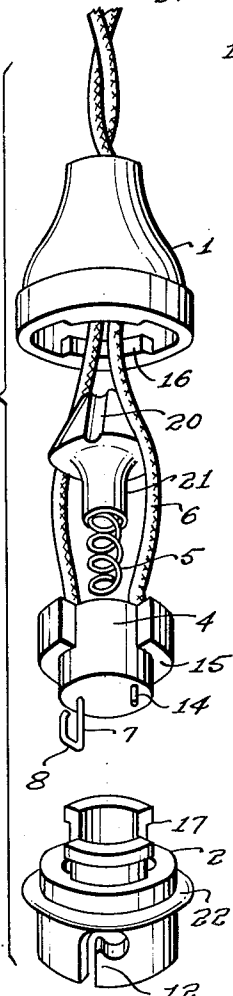


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FIG. 8.

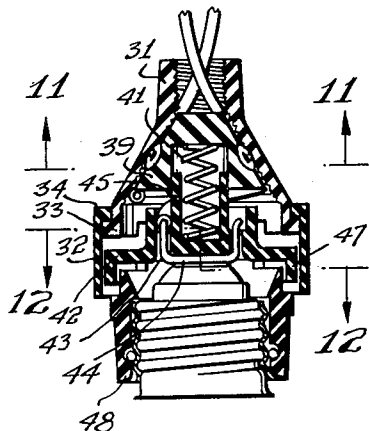


FIG. 10.

FIG. 9.

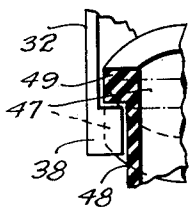
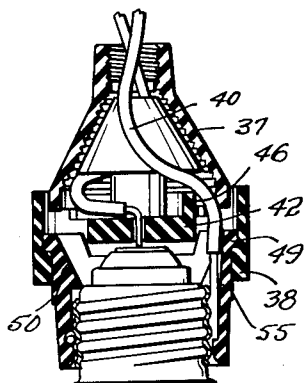


FIG. 17.

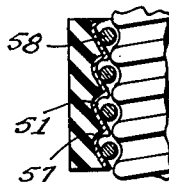
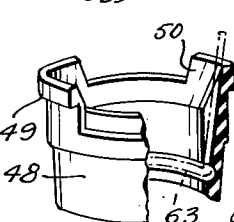
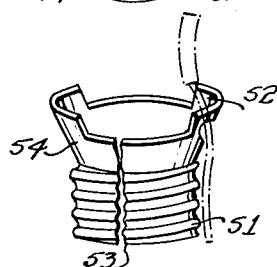
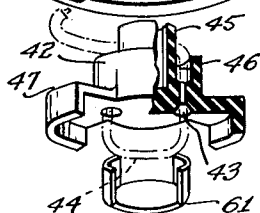
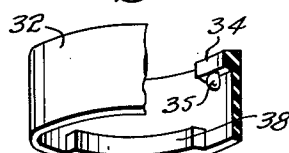
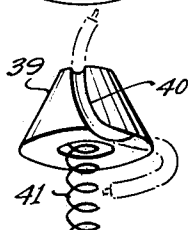
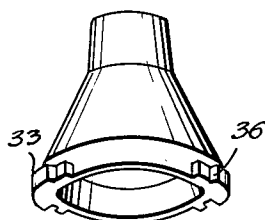


FIG. 15.

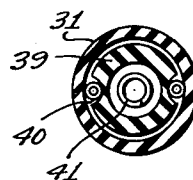


FIG. 11.

FIG. 12.

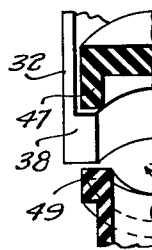
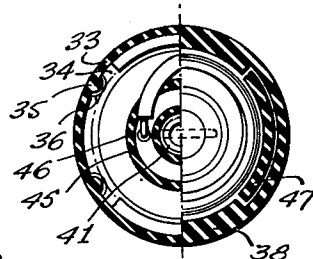


FIG. 16.

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UNITED STATES PATENT OFFICE

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SOCKET FOR ELECTRIC LAMPS

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Patent expires January 6, 1964

11 Claims. (Cl. 173—328)

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There are holders for electric lamps comprising mainly a hollow body of insulating material provided inwardly with an elastic block laterally grooved, for managing the passage of the supply wires with their insulations, while the finals, bare parts of said wires go successively through two holes, substantially parallel, to form a U the core of which forms a contact for the corresponding contact of the lamp-cap.

In such a lamp-holder, the elastic block fulfills simultaneously the functions of mechanically holding the wires by clamping and jamming effect between the hollow body and said block and of exerting an elastic contact pressure between the bare ends of the wires, which are bent back, and the corresponding contacts of the lamp-cap.

The main object of the improvements covered by the present invention is to provide the same advantages without using an elastic material for constituting the inside block; said improvements are characterized, chiefly, in that the inside block, made of a rigid material, is divided in two parts separated by a spring tending to keep them separated from each other, one of said parts carrying the lateral grooves for the mechanical fixation of the wires by jamming effect, while the other part carries the holes for bending back in a U shape the bare ends of the wires.

Another object of the invention is to provide a lamp-holder of the character described wherein the outside body receives, through a bayonet type joint, an inside sheath constituting the mounting collar of the lamp-cap, this collar having, at its upper part, slots which engage corresponding tenons belonging to the sliding part forming the lower part of the inner block which comprises two pieces separated by the spring.

Another object of the invention is to provide a lamp-holder of the character described wherein the tenons of the lower sheath, which are used for bayonet mounting in the outer body, have the same angular spacing as the slots thereof, so that the sliding part can be inserted first, bayonet-wise inside the body, by passing the tenons in the corresponding slots of said body and by a 90° rotation, and that the subsequent insertion of the sheath, bayonet-wise, causes, under the action of the spring, the engagement of the tenons of the sliding part in the slots of the sheath and body to lock the sheath which, then, cannot be taken apart without having previously pushed back the sliding part against the action of the spring outside the slots of the outer body.

Another object of the invention is to provide a lamp-holder of the character described where-

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in in the case of a lamp having a bayonet cap, the lower sheath is provided with the slots receiving the pins of the lamp-cap, and in the case of a screw cap, the screw thread can be either carried directly on the sheath or on a member independent of the latter, offering a certain amount of radial elasticity and connected therewith by a conical surface in such a manner that the screwing of the lamp-cap ensures simultaneously a radial tightening on the threads thereof.

The appended drawing show, by way of example, only, two types of embodiment of the invention. In said drawings:

Figure 1 is an elevational view partly in section, of the first embodiment, the lamp shade being assumed made of sheet metal;

Figure 2 is a corresponding sectional profile, the shade being assumed made of glass ware,

Figure 3 is a sectional view relative to Figure 1, along line III—III of said figure.

Figure 4 is a sectional view relative to Figure 2, along line IV—IV of said figure.

Figure 5 is a perspective view of all pieces to be assembled, in the relative positions they have after assembly.

Figure 6 is a sectional view along line VI—VI of Figure 2.

Figure 7 is a sectional view of a variant like Fig. 3.

Figure 8 is an elevational view partly in section of the second embodiment.

Figure 9 is a partly sectional profile corresponding to Fig. 8.

Figure 10 is a sectional view, in perspective, of the separate parts included in said second embodiment.

Figure 11 is a sectional view along line XI—XI of Figure 8.

Figure 12, in its left hand part, is a semi-section along line XII—XII of Figure 7, and, in its right hand part, a semi-section along line XIIa—XIIa of the same figure.

Figure 13 is a sectional view of one variant of the second embodiment, like Fig. 3.

Figure 14 is a cross sectional view of said variant.

Figure 15 is a sectional view on an enlarged scale.

Figures 16 and 17 are fragmentary sectional views of the embodiment illustrated in Figs. 8 to 12.

In the first form of embodiment (Figures 1 to 7), relative to a lamp-holder with a bayonet

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socket, the holder comprises the five following parts:

(1) A cover 1 of rigid material, preferably of insulating material.

This cover, at its upper part has inwardly the shape of a cone. It is provided, at its top, with the conventional screw thread, used, eventually, for the fixation of the holder on the lamp assembly.

At its lower part, this cover is inwardly cylindrical, and comprises inner fixation tenons 16 (Figure 2), diametrically opposite each of them enclosing an arc of 90 degrees.

(2) A socket 2, also of rigid material, preferably of insulating material, and reamed, inwardly, to the external diameter of lamp-cap 10 to be supplied, is connected with inner tenons 16 of the cover 1 by means of outer tenons 17 (Figure 2), diametrically opposite, each of them enclosing also an arc of 90 degrees. The tenon 17, after its insertion inside cover 1 and a rotation of a quarter of turn, bears on inner tenon 16. Besides, the socket 2 is provided with indentations in the part comprising no tenons. When cover 1 and socket 2 are in the correct engagement position, the tenons 16 and 17 coincide exactly and allow the socket indentations to remain free.

The socket 2 comprises, at its lower part, extensions 12 provided with slots for engaging the pins 11 of the lamp-cap.

(3) An inner wedge 3, also preferably of insulating material.

This wedge 3 has an outer shape similar to the inner shape of the cover 1. It is provided with two opposite grooves 20 the depth of which is smaller than the total diameter of the supply wire, insulation and covering included. These grooves are provided for guiding the wires while ensuring their jamming between cover 1 and wedge 3.

This wedge 3 is provided in its central portion with a blind hole 19 for receiving a spring 5, surrounded by an insulating bushing 21 integral with said wedge. Said bushing engages a corresponding hole 18 of the sliding part 4, so as to completely surround spring 5 while allowing the relative displacements of wedge 3 and sliding part 4.

(4) An inside sliding part 4, necessarily of insulating material.

This sliding part is cylindrical at its lower part, which can slide inside the hole of socket 2. At its upper part, it is provided with two tenons 15 which can engage inside the cylindrical part of the cover 1 and which extend over two opposite arcs of 90 degrees. Thus, these two tenons 15 can engage in the free space between tenons 16 and 17 when these last tenons are engaged together. The under part of tenons 15 bears, in engagement position of sliding part 4, upon the bottom of the socket indentations and, in that position, any rotation of socket 2 with respect to cover 1 is prevented, as illustrated in Figure 3.

The sliding part 4 is longitudinally provided with two pairs of holes, parallel in pairs, diametrically opposite and adequately oriented. Each of these pairs of holes opens at the under portion of the sliding part and faces the contacts 9 of lamp cap 10 when the latter engages by the pins 11 the slots provided on the extensions 12. At the upper portion of the sliding part 4, are provided two separate recesses 13 between the tenons 15, the upper ends of one pair of holes communicating with one of said recesses 13 and

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the upper ends of the second pair with the other recess 13.

(5) A spring or steel wire 5, is enclosed in the recesses 19 of wedge 3 and 18 of the sliding part 4. This spring, working by compression, tends to push apart the two pieces 3 and 4 and to apply wedge 3 against the inside wall of cover 1 and also to cause the tenons 15 of the sliding part 4 to bear against the bottom of the indentations provided in socket 2.

To assemble the lamp holder, after having passed the two wires 6 through the upper opening of cover 1, the wires are bared along a certain length at their ends. The bare part 7 of each conductor 6 is then inserted in one of the holes of sliding part 4 then bent back to form a loop 8 and re-inserted, in the reverse direction, in the adjacent hole of the same pair. The spring is enclosed in the corresponding recesses provided on wedge 3 and sliding part 4. Each covered part of wires 6 is arranged in each groove 20 of wedge 3. The whole assembly is then inserted inside cover 1. Keeping the wires in position, the sliding part is pushed farther inside the cover 1 by compression of spring 5. When the tenons 15 stand beyond the tenons 16 of cover 1, the sliding part 4 is turned one quarter of a turn. Spring 5 then keeps the tenons 15 of the sliding part 4 pressed against the tenons 16 and in these conditions, the openings used for the introduction of tenons 17 of socket 2 are free. Socket 2 is then introduced and rotated one quarter of a turn when its tenons 17 have stood beyond the tenons 16 of cover 1. During said motion, the tenons 17 drift before them the tenons 15 of sliding part 4 which also rotates one quarter of a turn, so that finally said tenons 15, under the action of spring 5, fall at the bottom of the indentations of sliding part 4 locking the three pieces together.

However, the reaction of spring 5 on wedge 3 keeps the two wires 6 clamped between wedge 3 and the inside wall of cover 1. Any traction on the wires tends to increase said wedging effect while keeping the wires still equipped with their covering well above the bare parts. Thus, said bare parts are never subjected to any traction and the withdrawing strength of the wires in the socket is only limited by the total strength of the wires including the covering. If care has been taken to effect the two successive quarters of a turn for engagement in opposite directions, the wires finally have been subjected to no torsion. They are provided with a slack allowing the correct actuation of the sliding part.

When engaging the lamp-cap the contacts 9 press upon the loops 8 of the wires, which they crush. Sliding part 4 pushed back by spring 5 keeps the contacting loops efficiently pressed against the contacts of the lamp-cap. The height of tenons 15 has been designed so that the vertical displacement imparted by the lamp-cap to the sliding part is not sufficient to allow the latter to rotate again over tenon 15 and, consequently, to unlock the holder.

The dismounting is effected in a reverse manner. The lamp-cap must first be removed and the current interrupted, then the sliding part 4 must be pushed back completely and said sliding part 4 and the socket 2 must be rotated together one quarter of a turn, until the socket is disengaged. It is then withdrawn, the sliding part being held by the spring on the tenons 15 of cover 1. The sliding part is then rotated one quarter of a turn in the opposite direction, and the spring

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and wedge can be withdrawn together and the wires removed.

The socket 2 may be provided with a collar 22 which ensures the holding of a lamp shade, either in sheet metal 23 or of glass-ware 24 with the interposition of a spring 25.

The cover 1 may also consist of two parts 26 and 27, easily molded, and screwed one into the other (Figure 7). Finally, cover 1 may be provided with inner adhesion grooves 28.

The lamp holder shown in Figures 8 to 17 is designed for lamps provided with a screw cap.

It comprises the following parts:

(1) A cover 31, similar, in principle, to cover 1. This cover, however, may be built in two parts 31 and 32, with a bayonet joint. To this effect, part 31 is provided with two opposite tenons 33 covering 90 degrees, and part 32, with corresponding tenons 34, studs 35, engaging during assembly the recesses 36, prevent thereafter the relative rotation of elements 31—32 the latter provided with assembly tenons 38, equivalent to tenons 16 of the foregoing example.

(2) Inside cover 31 is placed a wedging cone 39, having two side grooves 40 for guiding and jamming the wires. A central housing provided within said wedge accommodates spring 41.

(3) The inner sliding part 42 of insulating material is provided with a sheath 45 penetrating within the wedge housing for guiding said part and enclosing spring 41. This sliding member also carries the locking extensions 47 which penetrate between the assembling tenons 38 of cover part 32. Since this holder comprises only one axial contact point, the sliding member 42 comprises only one pair of holes 43, which open in an inner recess formed by the insulating wall 46 thereof. One of the wires, bared over a certain length, engages one of these holes, forms a contact loop 44 facing the axial contact and the free part of the wire is engaged in the adjacent hole, where it is lost.

(4) Socket 48, also of insulating material, has its upper part similar to the corresponding socket 2 of the bayonet-type socket. This part comprises two indentations which extend over two opposite arcs of 90 degrees. In the non indented part, an outer upper tenon 49 is provided for bearing upon the inner tenon 38 of the cover 32 for the engagement of the two pieces together.

The lower part of the socket is bored conically at 50 then cylindrically. It carries grooves 55 for the passage of the bare part of the second wire which engages into said grooves 55 and in a lower circular slot 63. A metallic liner 51, provided with an inner screw thread corresponding to the screw thread of the lamp-cap is inserted inside the socket. It comprises a conical part 54 corresponding to the conical bore 50, and a hole 52 for passing the wire. The liner 51 is provided with a slot 53 for providing a certain amount of elasticity. Thus the electrical contact between the bare wire and the metallic liner 51 is perfectly ensured.

(5) The holder is completed by a spring 41, enclosed between parts 39 and 42 which it tends to force away from each other by jamming the wires and by ensuring the contacts.

The assembling of this holder is effected by inserting the wires in the upper aperture of cover 31 and then bearing them over a certain length. Cone 39 is arranged between the wires which engage the grooves 40. The spring 41 and the sliding part 42 are then assembled. The bare part 44 of one of the wires is then introduced in the

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holes of the sliding part, by forming a central loop. The whole is then inserted inside the cover 31 and it is assembled after being pushed against the action of spring 41, by rotating one quarter of a turn.

The bare part of the second wire is then passed through hole 52 of liner 51 and inserted within the groove 55 of socket 48. Socket 48 is then inserted within the cover 31 and is rotated one quarter of a turn. In this motion, the sliding part 42 is angularly driven. After one quarter of a turn, its extensions 47 being no longer held fall at the bottom of the indentations of socket 48 and lock the holder.

The dismounting is effected by the reverse operation, after the bulb has been withdrawn and the sliding part has been completely pushed in to unlock the socket.

The annular electrode of the socket may also be realized as shown in Figures 13 to 15. The socket 56 is provided with a female screw thread 57 which may be of a special shape. In this screw thread is placed a metal spring 58 enclosing between it and piece 56 the outer electrode or liner 51, which engages two grooves (Figure 15) for multiplying the points of contact with each turn of the spring. The lamp-cap screws inside the spring and presses on the turns of the latter. The spring cannot rotate, its lower end being engaged, after torsion, in a vertical groove 59. On the other hand, its upper end is free.

The screw thread may have a conical section, so that the reaction of the sliding part on the lamp cap, which tends to displace the latter downwards clamps the turns of this spring on said cap with a view to prevent unscrewing and to ensure a better contact. The vibrations to which the installation may be subjected held this tightening. The unscrewing of the lamp cap, however, remains easy, after the lamp is lifted to release the turns of the spring.

The lower turn of the spring bears on the horizontal portion of the contact loop which must protrude slightly to pass from one groove to another.

What I claim is:

1. In a holder for electric lamps, in combination, a hollow cover provided with a screw thread for fixation on the lighting fixture and with a hole for the passage of the insulated supply wires, a block for clamping and wedging the wires, the outer surface of which has the inner shape of said hollow cover, provided with grooves having a depth smaller than the diameter of the insulated supply wire on said outer surface and with a central blind recess opening on its inner surface, a sliding part of insulated material designed for penetrating within said hollow cover underneath said block and provided with a blind recess opening on its upper surface and designed for guiding the walls of said first blind recess, with an insulating wall integral therewith surrounding said second blind recess and separated from its outer wall, and with at least one pair of parallel holes having a diameter larger than that of the bare supply wire and adapted to be crossed successively by the same bare wire with a view to form a U-shaped loop the core of which constitutes a contact for the corresponding contact point of the lamp cap, a lower socket, designed for penetrating within said hollow cover underneath said sliding part and provided with a hole for the mounting of said lamp cap, a compression spring housed inside said blind recesses for applying simultaneously said block against the inner

surface of said hollow cover and said sliding part against said socket, means for fixing said lamp cap on said socket and means for ensuring both the connection of said hollow cover with said socket and the locking of said connection by said sliding part.

2. A holder for electric lamps in accordance with claim 1, wherein the hollow body has a striated inner surface.

3. In a holder for electric lamps, in combination, a hollow cover in two pieces, the upper piece being provided with a screw thread for its fixation on the lighting fixture and with a hole for the passage of the insulated supply wires, the lower piece comprising a hole having a large diameter and capable of being fixed to said upper piece, means for the fixation of said lower piece to said upper piece, a block for clamping and wedging the wires, the outer surface of which has the inner shape of said hollow cover, provided with two grooves having a depth smaller than the diameter of the insulated supply wire on said outer surface and with a central blind recess opening on its inner surface, a sliding part of insulated material designed for penetrating within said hollow cover underneath said block, and provided with a blind recess opening on its upper surface and designed for guiding the walls of said first blind recess, with an insulating wall integral therewith surrounding said second blind recess and separated from its outer wall, and with at least one pair of parallel holes having a diameter larger than that of the bare supply wire and adapted to be crossed successively by the same bare wire with a view to form a U-shaped loop the core of which constitutes a contact for the corresponding contact point of the lamp cap, a lower socket designed for penetrating within said hollow cover underneath said sliding part and provided with a hole for the mounting of said lamp cap, a compression spring housed inside said blind recesses for applying simultaneously said block against the inner surface of said hollow cover and said sliding block against said socket, means for fixing said lamp cap on said socket and means for ensuring both the connection of said hollow cover with said socket and the locking of said connection by said sliding part.

4. A holder for electric lamps, in accordance with claim 3, wherein the upper piece of the hollow cover is provided on the outer surface of its lower portion with two opposite tenons, each of them covering a fourth of said surface, separated by two intervals of the same angular development and the lower piece of said hollow cover carries on the inner surface of its upper part two tenons, each of them ranging over one fourth of said surface and being spaced from each other by intervals of the same angular development, and is provided with two studs for engaging said intervals so as to prevent the relative rotation of said two pieces.

5. In a holder for electric lamps, in combination, a hollow cover provided with a screw thread for its fixation to the lighting fixture, with a hole for the passage of insulated supply wires, and with supporting means, a lower socket, designed for penetrating within said hollow cover, provided with a hole for the mounting of the lamp cap and with pressure means designed for pressing against the supporting means of said hollow cover with a view to ensure the connection of the latter with said socket, a block for clamping and wedging the wires, housed in said hollow cover above said socket, the outer surface of which has the

inner shape of said hollow cover, provided with two grooves having a depth smaller than the diameter of the bare supply wire on said outer surface and with a central blind recess opening on its lower surface, a sliding part of insulated material designed for penetrating within said hollow cover between said block and said socket, provided with a blind recess opening on its upper surface and designed for guiding the walls of said first blind recess, with an insulating wall integral therewith surrounding said second blind recess and separated from its outer wall, with at least one pair of parallel holes having a diameter larger than that of the bare supply wire and adapted to be crossed successively by the same bare wire with a view to form a U-shaped loop the core of which constitutes a contact for the corresponding contact point of the lamp cap and with means adapted for locking the connection of said hollow cover with said socket, a compression spring housed inside said blind recesses for applying simultaneously said block against the inner surface of said hollow cover and said sliding part against said socket and means for fixing said lamp cap to said socket.

6. In a holder for electric lamps, in combination, a conical cover provided, with a screw thread at its upper part for its fixation to the lighting fixture, with a hole for the passage of the supply wires, and with a cylindrical part extending the larger base of the cone carrying on its inner surface two opposite tenons each of them covering one fourth of a circle and separated by intervals covering one fourth of a circle, a block for clamping and wedging the wires, the outer surface of which has the inner shape of said cover, provided with two grooves having a depth smaller than the diameter of the supply wire on said outer surface and with a central blind recess opening on its lower surface, a sliding part of insulated material designed for penetrating within said cover underneath said block, provided with a blind recess opening on its upper surface and designed for guiding the walls of said first blind recess, with an insulating wall integral therewith surrounding said second blind recess and separated from its outer wall, with at least one pair of parallel holes having a diameter larger than that of the bare supply wire adapted to be crossed by the same bare wire with a view to form a U-shaped loop the core of which constitutes a contact for the corresponding contact point of the lamp cap and, at its outer surface, the dimensions of which are smaller than or equal to the inside diameter of the tenons of said cover, with two tenons having an angular development of one fourth of a circle separated by two intervals having an equal angular development, the outer diameter of said tenons being equal to the inner diameter of the intervals of said cover, a lower socket, designed for penetrating within said cover underneath said sliding part, provided with a hole for the mounting of said lamp cap, with two upper extensions having the shape of parts of cylinders, each of them covering one fourth of a turn and having an inner diameter larger than or equal to the inner diameter of the tenons of said cover and an outer diameter equal to the inner diameter of the intervals of said cover, carrying two tenons such that the height between the base of said extensions and the base of said tenons is equal to the sum of heights of the tenons of said cover and of said sliding part, a compression spring housed in said blind recesses for applying simultaneously said block against the inner surface of

said cover and said sliding part against said socket and means for fixing said lamp cap on said socket.

7. A holder for electric lamps with bayonet-cap, in accordance with claim 6, wherein the lower socket carries a lower cylindrical part the inner diameter of which is slightly larger than the outer diameter of the cap of the lamp and is provided with two extensions having slots for engaging the pins of said cap, and wherein the sliding part is bored with two pairs of holes, parallel two by two, diametrically opposite, opening at its upper part in two recesses included between its blind recess and its insulating wall and opening at its lower part facing the contact points of the lamp cap when the latter is fitted by its studs on these extensions.

8. A holder for electric lamps with screw cap, in accordance with claim 6, wherein the sliding part is provided with a single pair of parallel holes opening at its upper part in a housing formed between its insulating wall and the wall of its blind recess and wherein the lower socket is provided with longitudinal slots along its inside bore and a circular groove following said slots, said slots and said groove being adapted to receive the second bare supply wire and wherein, finally, the fixation of the lamp cap on said socket is ensured by an independent element with a radial elasticity offering a conical surface for assembly.

9. A holder for electric lamps with screw cap, in accordance with claim 8, wherein the independent element for the fixation of the base of the lamp cap comprises a metal lining with a slot, comprising a conical upper part bored with a hole for the passage of the bare wire and a lower part provided with an inner screw thread corresponding to the screw thread of the cap of the lamp and wherein the lower part of the socket is bored conically in its upper portion and cylindrically in its lower portion.

10. A holder for electric lamps with bayonet-cap, in accordance with claim 6, wherein the lower socket carries a lower cylindrical part the inner diameter of which is slightly larger than the outer diameter of the cap of the lamp and is provided with two extensions having slots for engaging the

pins of said cap, and wherein the sliding part, on one hand, is bored with two pairs of holes, parallel two by two, diametrically opposite, opening at its upper part in two recesses included between its blind recess and its insulating wall and opening at its lower part facing the contact points of the lamp cap when the latter is fitted by its studs on these extensions and, on the other hand, is integral, below its tenons, with a solid cylindrical part the outer diameter of which is equal to the diameter of its intervals to be centered inside the two upper cylindrical extensions of the socket.

11. A holder for electric lamps with screw cap, as claimed in claim 6, wherein the sliding part is provided with a single pair of parallel holes opening at its upper part in a housing formed between its insulating wall of its blind recess and wherein the lower socket is provided with longitudinal slots along its inside bore and a circular groove following said slots, said slots and said groove being adapted to receive the second bare supply wire and wherein, finally, the fixation of the lamp cap on said socket is ensured by a metal spring the lower end of which is bent back inwardly and wherein the socket carries at its inner part a conical screw thread designed for receiving said spring and, at its lower portion, a transverse groove for housing said bent back end of the spring.

ANDRÉ AUGUSTE FELIX BEDOISEAU.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
109,508	Godfrey et al.	Nov. 22, 1870
987,414	Thomas	Mar. 21, 1911
2,022,977	Quarles	Dec. 3, 1935

FOREIGN PATENTS

Number	Country	Date
97	Great Britain	of 1910
1,673	Great Britain	of 1909
354,901	France	Oct. 18, 1905