

May 9, 1967

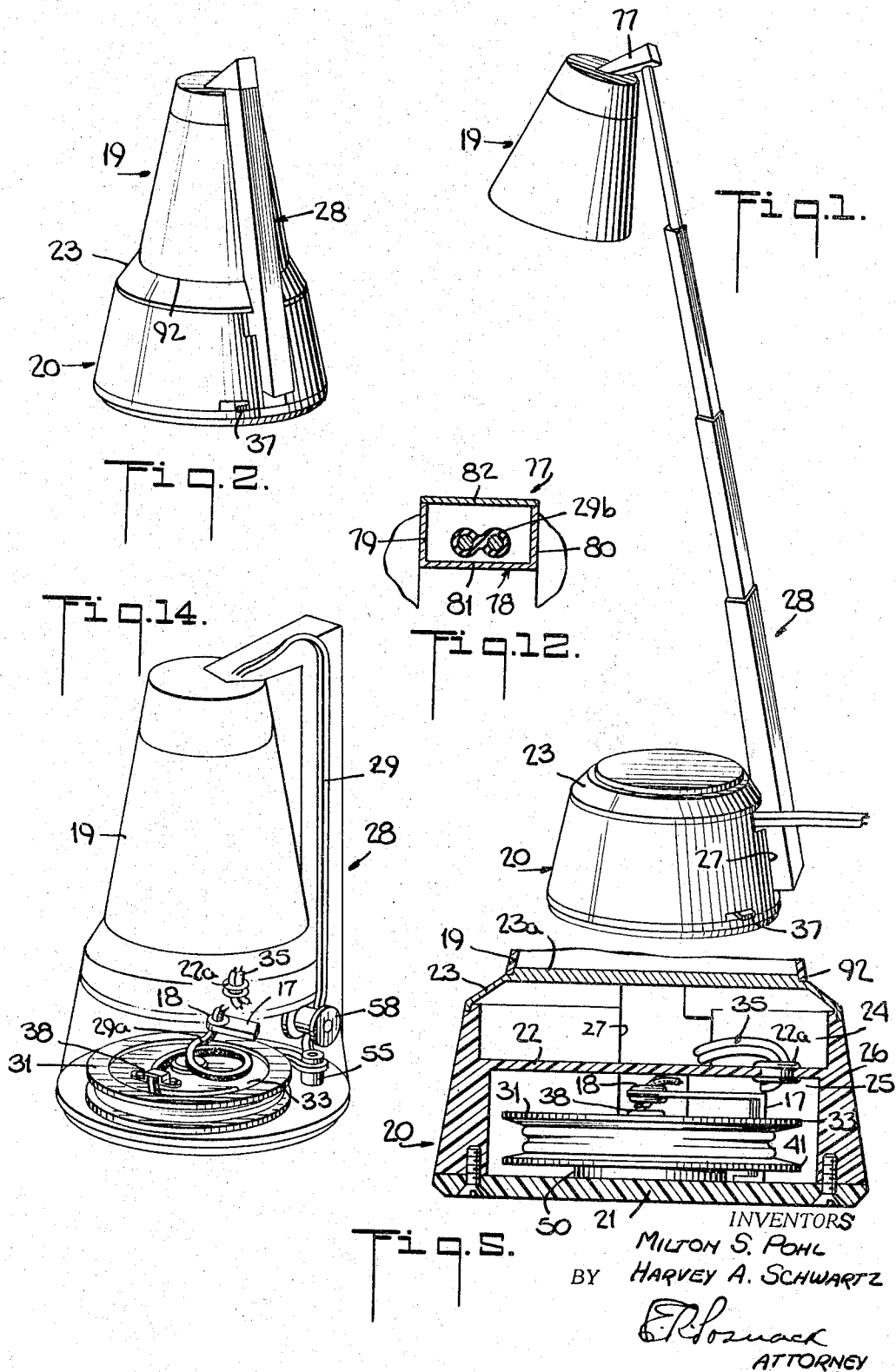
M. S. POHL ET AL

3,319,061

ADJUSTABLE ELECTRIC LAMP

Filed Jan. 24, 1966

5 Sheets-Sheet 1



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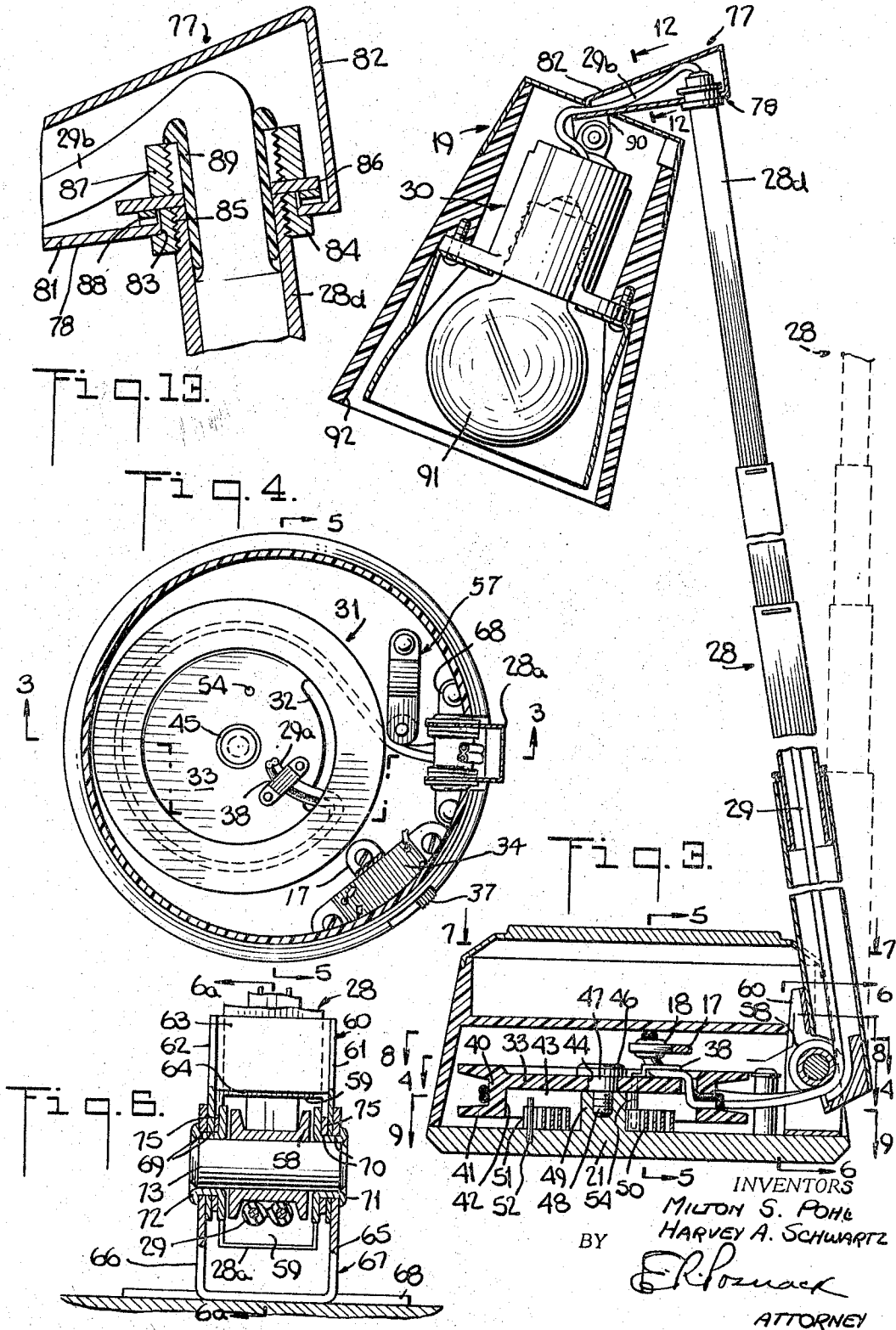
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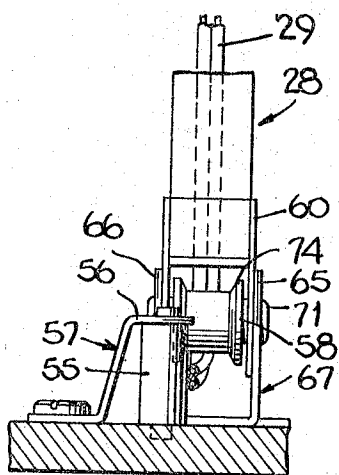


Fig. 6a.

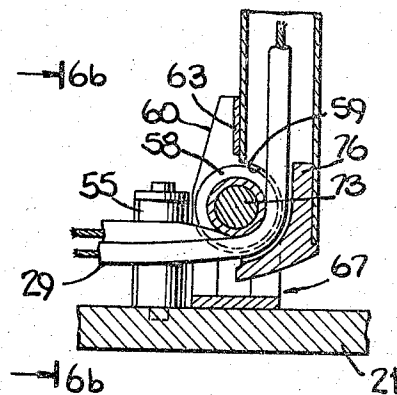


Fig. 6b.

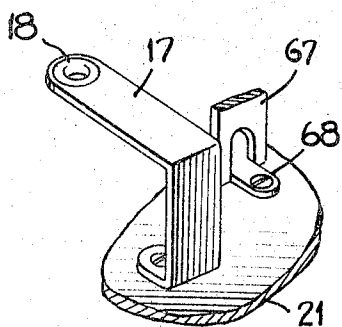


Fig. 10A.

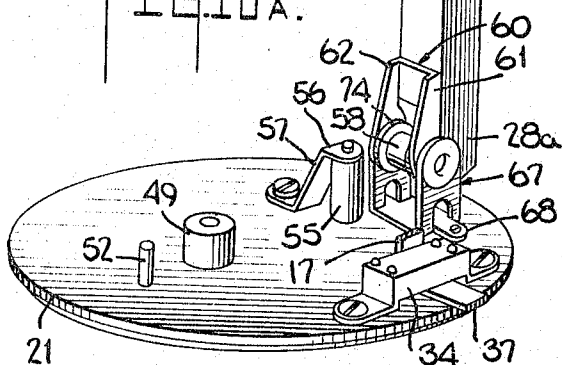


Fig. 10.

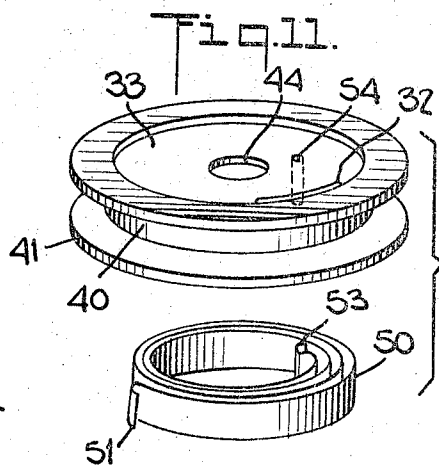


Fig. 11.

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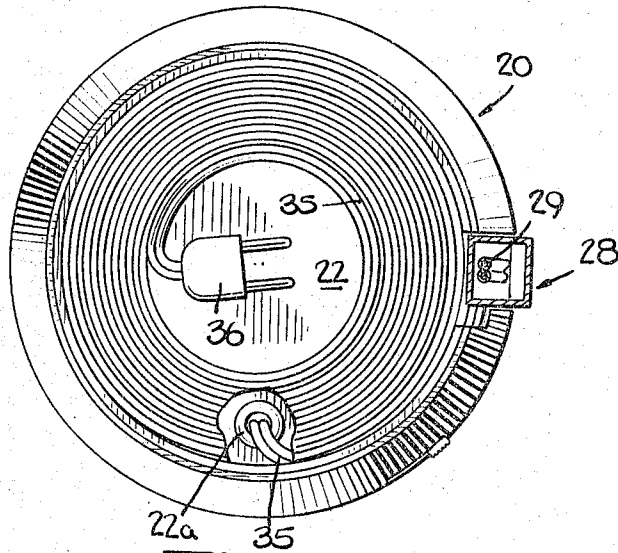


Fig. 7.

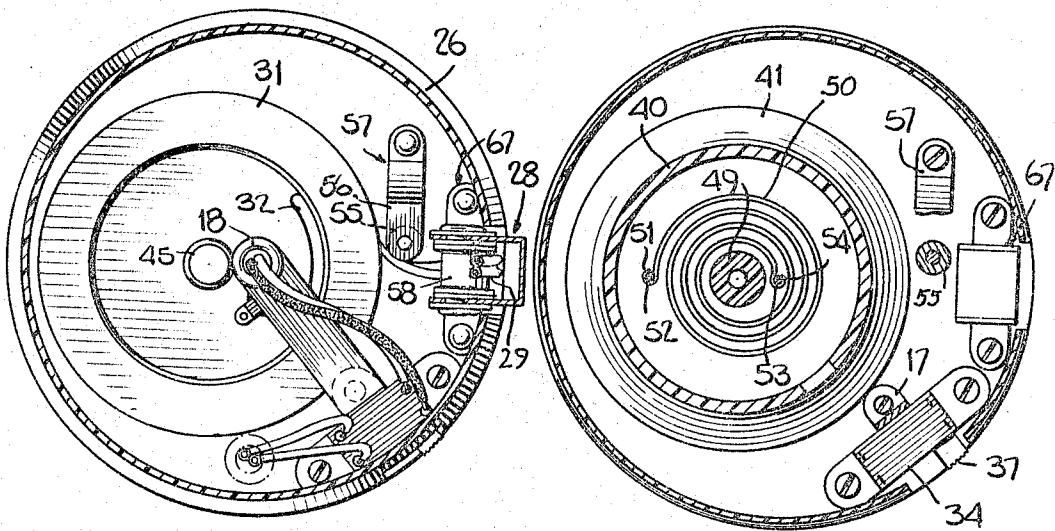


Fig. 8.

Fig. 9.

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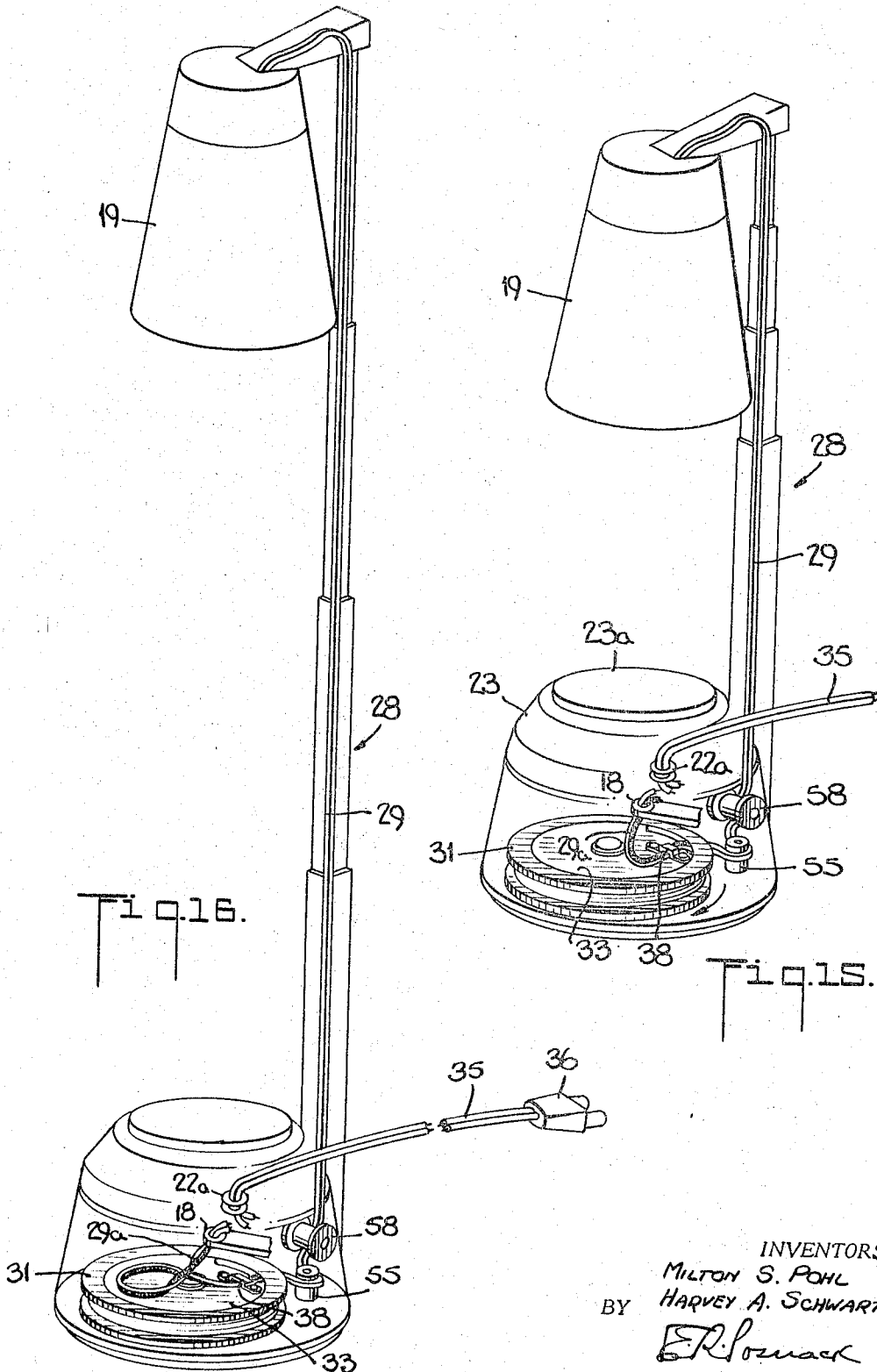
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3,319,061

ADJUSTABLE ELECTRIC LAMP

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Filed Jan. 24, 1966, Ser. No. 522,754
17 Claims. (Cl. 240—81)

This invention relates to electric lamps, and is particularly directed to portable high-intensity lamps having an extensible or telescopic arm structure carrying a socket, lamp and shade.

Lamp devices of the above-mentioned category generally embody a transformer to reduce the line voltage to a voltage sufficiently low to enable the extensible telescopic casing to serve as part of the electric circuit connected to the socket—an arrangement which is feasible since the transformer is adapted to isolate the secondary wiring from the main line. It is the primary object of this invention to provide a safe high-intensity lamp structure operating directly from the main line, thereby eliminating the transformer and effecting consequent production economies that can accrue to the benefit of the consumer.

In the accomplishment of the above-stated object, it has been our objective to keep the extensible telescopic arm structure free from the obviously dangerous high-line voltage without the expedients of employing an inner telescoping conductor insulated from the outer casing, or using a conventional slip-ring or commutation arrangement, or resorting to an insulated line cord which would protrude from the base of the extensible arm when it is in its contracted condition and which would be drawn up into the telescopic tubing when the arm is operatively extended. The said special inner telescoping conductor would be costly and would present the danger of interrupted electrical connections and broken contacting between the mutually slidable telescopic components. The slip-ring or commutation expedient would also be costly, and would present the above-mentioned danger of interrupted connections and broken contacting. And the protruding cord arrangement would present the danger that when extended to its full length the cord could, under certain circumstances, either separate itself from the socket or displace the lamp from its initial position.

In the solution of the problem of providing a high-intensity lamp of the above-mentioned category without the disadvantages above-stated, we have succeeded in providing a novel structure employing a reel device carrying insulated conductors leading from the main line and positioned within an extensible telescopic arm and electrically connected to the socket mounted upon the end arm section, the arrangement being such that the reel operatively accommodates the wire as the telescopic arm is being extended or contracted. In the process of solving the problem it was necessary to provide means for twisting the line cord sufficiently to permit the full extension of the telescopic arm, and yet meet the specifications of certain underwriter laboratories that the maximum rotation of the conductors be limited to 360° so as to avoid dangerously excessive twisting and straining of the line cord. Our novel device meets these requirements for all realistic and practical sizes of extension arms by providing a predetermined pre-load twist of the line cord when the telescopic arm is in its fully contracted position, whereby there will be no greater twist of the cord from its neutral or untwisted condition than the 360° limitation.

It is a further object of our invention to provide a lamp structure having all the advantages of the known low-voltage high-intensity lamps, but operable directly from the line voltage, and provided with means for maintaining a positive electrical connection between the main line

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and the socket throughout all positions of the telescopic arm.

Another object of this invention is to eliminate the hazard inherent in said low-voltage lamp devices wherein the usual 12 volt lamp sockets could receive 6 volt bulbs—an arrangement which, if the circuit were not properly fused, could cause dangerous overheating of the transformer. Such a danger is not possible with our invention, since the conventional high-voltage high-intensity lamp sockets do not accommodate any bulbs except those of the correct voltage. Moreover, even if some special construction of a high-voltage high-intensity lamp could accept a different or incorrect voltage bulb, no damage to the device could occur since there is no transformer to overheat.

Other objects, features and advantages will appear from the drawings and the description hereinafter given.

Referring to the drawings,

FIG. 1 is a perspective view of the lamp of our invention shown in extended position.

FIG. 2 is a perspective view thereof shown in contracted position.

FIG. 3 is a fragmentary vertical cross-section of said device in extended position, a portion thereof being shown in elevation, the section being taken substantially along line 3—3 of the sectional plan of FIG. 4, the broken lines indicating a different pivotal position of the telescopic stem.

FIG. 4 is a sectional plan of FIG. 3 taken along line 4—4, parts being removed for clarity.

FIG. 5 is a fragmentary vertical section of the base member taken along line 5—5 of FIGS. 3 and 4, parts being removed for clarity, the device being in its operatively contracted position, a fragment of the shade member being shown in engagement with the cover of the base member.

FIG. 6 is an enlarged fragmentary section of FIG. 3 taken along line 6—6 thereof.

FIG. 6a is a section of FIG. 6 taken along lines 6a—6a.

FIG. 6b is a fragmentary section of FIG. 6a looking in the direction of arrows 6b—6b.

FIG. 7 is a fragmentary sectional plan of FIG. 3 taken along line 7—7, showing the base member with its cover removed and the line cord and plug positioned within the upper chamber of the base, parts being broken away for clarity.

FIG. 8 is a sectional plan of FIG. 3, the section being taken substantially along line 8—8, parts being removed for clarity.

FIG. 9 is a section of FIG. 3 taken along line 9—9.

FIG. 10 is a perspective view of a portion of the base and stem of said device, portions being removed for clarity.

FIG. 10A is a fragmentary perspective of the floor of the base portion, showing the bracket support for the tubular conductor holding member, parts being removed for clarity.

FIG. 11 is an exploded perspective view of the reel member and spring constituting parts of said device.

FIG. 12 is a fragmentary section of FIG. 3 taken along line 12—12.

FIG. 13 is an enlarged fragmentary vertical section of the upper portion of the telescopic stem and the arm connecting said stem to the shade member.

FIG. 14 is a semi-schematic and partially phantom perspective view of the lamp device in its contracted position, showing the pre-twisted position of the convoluted portion of the conductor above the reel.

FIG. 15 is a view substantially like FIG. 14, but with the device in a partially extended position, showing the neutral or untwisted position of said convoluted portion of the conductor.

FIG. 16 is a view substantially like FIGS. 14 and 15,

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ut with the device in its fully extended position, showing the full twisted position of said convoluted portion.

The form of my invention illustrated in the drawings embodies a hollow base member 20 having a floor 21, an intermediate horizontal partition 22 and a cover member 23, whereby said base member is divided into an upper compartment 24 and a lower compartment 25. The two said compartments are laterally enclosed by the laterally enclosed by the lateral wall 26—illustrated as of rusto-conical configuration—said wall being integral with said partition 22 and resting upon said floor 21 in the particular embodiment shown. The said lateral wall 26 contains a slotted portion 27 to accommodate the lower portion of the hollow telescopic stem 28, the latter having means at the top thereof for supporting the shade member 19 and lamp socket assembly 30 in a manner to be hereinafter described.

Positioned longitudinally within said stem 28 is the upper portion of the flexible insulated double-wire conductor 29 the upper terminals of which are electrically connected to said socket assembly 30, the lower portion of said conductor being wound about the spring-loaded reel 31 and extending therefrom upwardly through the apertured portion 32 in the upper flange wall 33 of said reel to the appropriate terminals on terminal-switch member 34 mounted on said floor 21, as illustrated in FIG. 8. In the particular embodiment illustrated, the said double-wire conductor extends upwardly from said flange wall 33 of the reel through the tubular holding member 18 supported by the bracket 17 attached to the said floor 21 of the base. Also electrically connected to said terminal-switch member 34 is the line cord 35 having on its outer end the plug 36 adapted for operative attachment to a suitable wall socket electrically connected to a source of current supply, the opposite end portion within compartment 24 extending through the grommet 22a attached to said partition 22 and to appropriate terminals of said member 34, as shown in FIG. 8. A manually manipulable switch element 37 on said member 34 is adapted for selective opening and closing of the circuit from line cord 35 to the conductor 29 in a manner known to those skilled in the art.

It should at this point be noted that the portion of the said conductor 29 emerging from said apertured portion 32 of said reel 31 is fixedly secured by the clamping member 38 to the said upper flange wall 33 of the reel, another portion of conductor 29 above said flange being held against twisting at a predetermined point thereof. In the particular embodiment illustrated, said conductor 29 is held against twisting by said member 18, the conductor extending therefrom and beyond said member 18 to said terminal switch member 34. The arrangement is such as to leave a section 29a of said conductor 29 of fixed length between the reel 31 and said member 18, said section being in loose convoluted form. The length of said convoluted section 29a is predetermined to enable it to become coiled and uncoiled predetermined amounts during the operative rotation of said reel 31 in order to prevent an overtwisting of said section, all in a manner to be hereinafter described.

The said reel 31, positioned within said lower compartment 25, comprises a central cylindrical wall 40 flanked by said upper flange wall 33 and the lower flange 41, the latter forming the central bottom opening 42 of the reel chamber 43 defined by said walls 40 and 33. At the center of said reel is the axial cylindrical bearing wall 44 mounted over and in rotatable engagement with the reel axle 45 which, in the particular embodiment illustrated, is in the form of a stud having the slotted head 46, the bearing shank 47 and the lower threaded portion 48, the latter being in threaded engagement with the internally threaded boss 49 extending up from said floor 21. A coil spring 50 rests upon said floor 21 and extends upwardly partly into said reel chamber 43. Said spring has an outer hooked portion 51 attached to the

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anchor element 52 extending up from the floor 21 and an inner hooked portion 53 attached to the anchor element 54 extending down from wall 33 into said reel chamber 43. The arrangement is such that when the telescopic stem 28 is in its fully contracted position illustrated in FIG. 14 the reel 31 is in a predetermined initial position and has a predetermined maximum length of conductor 29 wound thereover, the said spring 50 being in its least strained condition, thereby yieldably resisting the operative unwinding of the conductor 29 from said reel, in the manner hereinbelow set forth.

Rotatably mounted on the said floor 21, in the region of the said slotted portion 27 of base member 20, is the vertical roller 55, said roller being supported in said position by the arm 56 of the bracket 57 mounted on the floor, the top of said roller being rotatably engaged by said arm. Adjacent said vertical roller 55 is the horizontal roller 58 disposed in said slotted portion 27 and positioned at the base of said telescopic stem 28. As will be seen from FIGS. 6 and 6a, the bottom section 28a of said stem has its lower end portion recessed at 59 to accommodate said horizontal roller 58. Affixed to the inner side of said bottom section 28a is the channel bracket 60 with the lateral sides 61 and 62 flanking said horizontal roller 58, the web 63 of said channel bracket being apertured at 64 to receive therein said horizontal roller 58. Flanking said lateral sides 61 and 62 are the two upstanding legs 65 and 66 of the hinge bracket 67 the base 68 of which is attached to said floor 21. The said sides 61 and 62 and the said legs 65 and 66 have horizontally aligned apertures 69 and 70, respectively, through which extend the eyelets 71 and 72; and positioned within and affixed to the inner surfaces of said eyelets is the roller axle 73. The said horizontal roller 58 is rotatably mounted over said axle 73, said roller having flanges 74 for retaining engagement with the conductor 29 which, as will hereinafter appear, is in operative engagement with both rollers. The spring washers 75 between the sides 61 and 62 of said channel bracket 60 and the adjacent flanges of the respective eyelets 71 and 72 serve to hold the pivotal assembly firmly in place.

The arrangement is such that the conductor 29 from said reel 31 is rollably received first by the said vertical roller 55 and then by the said horizontal roller 58, the conductor being twisted 90° between the two rollers, whereafter the upwardly extending conductor 29 remains in substantially untwisted condition throughout its position within the telescopic stem 28. A guide member 76, affixed to the bottom of the stem 28 and spaced from the roller 58, aids in guiding the conductor to its proper upward path. The said sides 61 and 62 of said channel bracket affixed to said stem are rotatably mounted over said eyelets 71 and 72; hence the entire telescopic stem 28 can readily be pivoted between selected positions about the axis of said axle 73, as indicated in FIG. 3 by the broken lines.

The said stem 28 has four telescopically fitted sections 28a, 28b, 28c and 28d, the frictional engagement between the contacting sections being such as to resist the action of the said spring 50 when the stem is brought to extended positions, whereby the stem is maintained in any adjusted length thereof, the manner of effecting such frictional engagement being known to those skilled in the art.

At the top of telescopic section 28d is the hollow arm 77 rotatable about the longitudinal axis of said latter section, said arm pivotally supporting the assembly of shade 19 and socket assembly 30. In the particular embodiment shown (see FIGS. 3, 12, 13) said arm 77 comprises a channel member 78 having two upstanding sides 79 and 80 flanking the base 81, and an upper trim member 82 serving as a cover. Said base 81 has an apertured portion 83 rotatably mounted over the bearing collar 84 which is in threaded engagement with the upper threaded portion 85 of stem section 28d. Above said collar 84 is the washer 86 engaged by the nut 87 thereabove, said

nut being mounted over said threaded portion 85. There is a spring washer 88 between said washer 86 and said base 81 whereby said base and said bearing collar are maintained in yieldable engagement for controlled rotation. Affixed to the upper end of said telescopic section 28d is the tubular fitting 89 which fixedly engages the adjacent portion of conductor 29, the said conductor having an upper terminal portion 29b extending therebeyond within said arm 77 to the socket assembly 30 to which it is connected in known manner. The said channel member 78 is joined to the lug 90 which is pivotally connected to said socket member 30 in known manner. The arrangement is hence such that the shade 19 and associated socket assembly 30, carrying the lamp 91, can be positioned at various positions about and inclinations to the telescopic stem 28.

The said cover 23 of base 20 can readily be removed to expose the said upper chamber 24 which is proportioned to receive therein the line cord 35 and plug 36 when the device is not in use.

In its inoperative position, as illustrated in FIGS. 2 and 14, the telescopic stem 28 is in its fully contracted position, and the conductor within the shortened stem is in taut condition, due to the pull exerted by the spring 50 on the reel 31. The lower telescopic section 28a and the shade 19 are so proportioned and positioned that the bottom periphery 92 of the shade is in resting engagement with the top of the said cover 23 when the device is in its said inoperative and fully contracted position. It will be noted that the cover 23 has an upwardly extending portion 23a, the said bottom periphery 92 of the shade being proportioned to fit over and engage the outer periphery of said portion 23a, whereby the shade is held against displacement. In such closed position the device is compact and presents an attractive appearance. (See FIGURES 2 and 5.)

In its inoperative position, the said convoluted section 29a of the conductor, positioned as aforesaid in the said lower compartment 25, rests upon the flange wall 33 of the reel 31 below the partition 22. In this position the said portion 29a has been pre-twisted in a counterclockwise direction a predetermined amount, as indicated in FIG. 14. A preferred extent of pre-twist is more than 180°, but less than 360°, from the neutral or untwisted position of the conductor.

In the operation of extending the telescopic stem 28 from its fully contracted initial position, the conductor 29 will be pulled upwardly due to its anchorage at said fitting 89 at the top of the stem 28, as above stated. Such upward pull will cause the reel 31 to rotate, against the action of said spring 50, thereby unwinding the conductor an amount corresponding to the operative extension of the telescopic stem. At the same time, the said convoluted section 29a of the conductor will uncoil and untwist itself in a clockwise direction until it reaches a neutral or untwisted position, as illustrated in FIG. 15. As the stem is further extended, the convoluted section 29a will continue its twisting action, twisting in a clockwise direction, until it reaches its fully twisted condition illustrated in FIG. 16. At this point the stem 28 is in its fully extended final position and the reel 31 is in its final operative position.

Assuming the degree of twist beyond neutral to be 360°, the total twisting action has thus occurred through an angle beyond 540°. Such an extensive twist permits the telescopic stem to be extended a considerable amount, thereby providing considerable latitude in adjusting the lamp for desired lighting effects. In the example above given, this was accomplished with no more than the usually permissible 360° twist beyond the neutral position.

It is thus evident that this invention is adapted to permit a considerable unwinding rotation of reel devices carrying conductors and yet limit the effective twist of the conductor to safe ranges permitted by Underwriters' Laboratories. In the particular lamp structure above de-

scribed, the convoluted section 29a takes substantially all the twisting due to the rotation of the reel, leaving the rest of the conductor within the telescopic stem unaffected by the operative rotation of the reel.

It is further evident that our invention enables portable high intensity lamps with adjustable and extensible lamp-supporting stems to operate directly off line current without transformers and without the dangerous and costly expedients of commutation and slip rings.

In the above description, the invention has been disclosed merely by way of example and in preferred manner; but obviously many variations and modifications may be made therein. It is to be understood, therefore, that the invention is not limited to any form or manner of practicing same, except insofar as such limitations are specified in the appended claims.

What we claim is:

1. An extensible electric lamp device of the class having a hollow telescopic stem operatively extendable from a predetermined initial contracted position to a fully extended final position, and a socket and shade assembly mounted adjacent the top of said stem, comprising a spring-loaded reel adjacent the bottom of said stem and operatively rotatable between predetermined initial and final positions, a flexible conductor member longitudinally disposed within said stem and having a lower portion thereof wound upon said reel, the upper portion of said conductor member having a part thereof anchored to the stem and electrically connected to said socket, said lower portion of the conductor having a part extending from said reel and containing a convoluted section of fixed length attached to said reel and to a point on said device spaced from the reel, said stem and reel being so proportioned and positioned that upon an operative extension of said stem from its said initial to its said final position said reel will be operatively rotated by the pull of said conductor from its said initial to its said final position, whereby said convoluted section will be caused to progressively twist in a predetermined direction during the operative rotation of said reel toward its said final position, and a terminal member adapted for electrical connection to a source of current supply, said convoluted section being electrically connected to said terminal member.

2. An extensible electric lamp device according to claim 1, said convoluted section being pre-twisted a predetermined amount, when said reel is in its said initial position, from its neutral untwisted position in a direction opposite to that of said predetermined direction.

3. An extensible electric lamp device according to claim 2, said convoluted section being so positioned and proportioned that when said reel is in its said final position the said convoluted section will be twisted a predetermined amount beyond said neutral position in said predetermined direction.

4. An extensible electric lamp device according to claim 1, said device having a hollow base member housing and rotatably supporting said reel, said base member having a floor, a cover and an intermediate horizontal partition dividing said base member into upper and lower compartments, said terminal member being supported by said base, and a line cord adapted for electrical connection to a suitable source of current supply and having its inner terminal connected to said terminal member, said line cord extending through said upper compartment, said reel being disposed in said lower compartment.

5. An extensible electric lamp device according to claim 4, said upper compartment being proportioned to accommodate therein said entire line cord, said cover being removably connected to said base member, whereby access may be had to said line cord when positioned in said upper compartment.

6. An extensible electric lamp device according to claim 4, said base member having a lateral wall laterally enclosing said upper and lower compartments, said lateral wall having a slotted portion therein proportioned to ac-

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accommodate therein the lower end portion of said telescopic stem, said conductor extending from the portion thereof wound over said reel through said slotted portion to said telescopic stem.

7. An extensible electric lamp device according to claim 6, said base member having roller means adjacent said slotted portion in operative engagement with the adjacent portion of said conductor, and pivotal means adjacent said slotted portion coactively connecting the bottom portion of said stem to said base.

8. An extensible electric lamp device according to claim 7, said roller means comprising a vertical roller mounted on the said floor of said base member, a horizontal roller mounted between said vertical roller and said stem, recessed means at the base of said stem accommodating said horizontal roller, whereby said portion of the conductor extending from said reel to said stem will first engage said vertical roller and then twisted 90° to peratively engage said horizontal roller, to be directed downwardly into said stem.

9. An extensible electric lamp device according to claim 8, a horizontal axle rotatably supporting said horizontal roller, means to support said axle, bearing means secured over the opposite ends of said axle, said pivotal means attached to said stem being rotatably mounted over said bearing means.

10. An extensible electric lamp device according to claim 1, said device having a hollow base member housing and rotatably supporting said reel, said telescopic stem and base member being so proportioned and positioned relative to said shade that when the stem is in its fully contracted position the lower periphery of said shade will be in engagement with the top of said base member.

11. An extensible electric lamp device according to claim 10, said device having pivotal means connected to the bottom portion of said stem, said base member having a top cover with an upwardly protruding portion, said latter portion being so positioned and proportioned relative to said shade that when the stem is in its said fully contracted position the said periphery of the shade will be in position for enveloping engagement with said upwardly protruding portion, whereby said shade and stem will be held against lateral displacement.

12. An extensible electric lamp device according to claim 1, said device having a hollow base member housing and rotatably supporting said reel, pivotal means on said base member connected to the bottom portion of said stem, an arm rotatably supported at the top of said stem and in supporting engagement with said socket and shade assembly, said conductor having an upper terminal portion thereof extending from the top of said stem toward and being electrically connected to said socket, said arm being in supporting engagement with said upper terminal portion of said conductor, said arm being of hollow construction

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and containing therein said upper terminal portion of said conductor, said arm having a base rotatably supported at the top of said stem, and a bearing collar attached to the top of said telescopic stem, said base having an apertured portion embracing said collar and in pressing rotatable engagement therewith.

13. An extensible electric lamp device according to claim 12, said arm having a channel-like portion embodying said base and two upstanding sides flanking said base and pivotally supporting said socket.

14. An extensible electric lamp device according to claim 1, said device having a hollow base member housing and rotatably supporting said reel, said reel having an upper wall with an apertured portion therein, said portion of the conductor which extends from the part thereof wound over said reel extending through said apertured portion and joining said convoluted section, a clamping member securing one end of said convoluted section to said upper wall, and securing means attached to said base member and spaced from said clamping member and holding the other end of said convoluted section against twisting.

15. An extensible electric lamp device according to claim 14, said base member having an intermediate partition separating said member into upper and lower compartments, said reel being disposed in said lower compartment, said securing means comprising a tubular member in embracing engagement with the adjacent portion of said convoluted section, said tubular member being disposed above said upper wall of said reel, whereby said convoluted section rests upon said upper wall.

16. An extensible electric lamp device according to claim 14, said reel having a bottom flange, a chamber in said reel with an open portion at the bottom defined by said flange, and a coil spring at the bottom of said base member and extending into said chamber, one end of said spring being anchored to said base member and the other end to said reel.

17. An extensible electric lamp device according to claim 16, said base member having a floor, a boss extending upwardly from the floor and surrounded by said spring, and an axle supported by said boss, said reel being in rotatable engagement with said axle.

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