Jan. 2, 1934. H. F. TEICHMANN 1,942,073

ROTARY SOCKET FOR ELECTRIC LAMPS

Filed Jan. 24, 1933

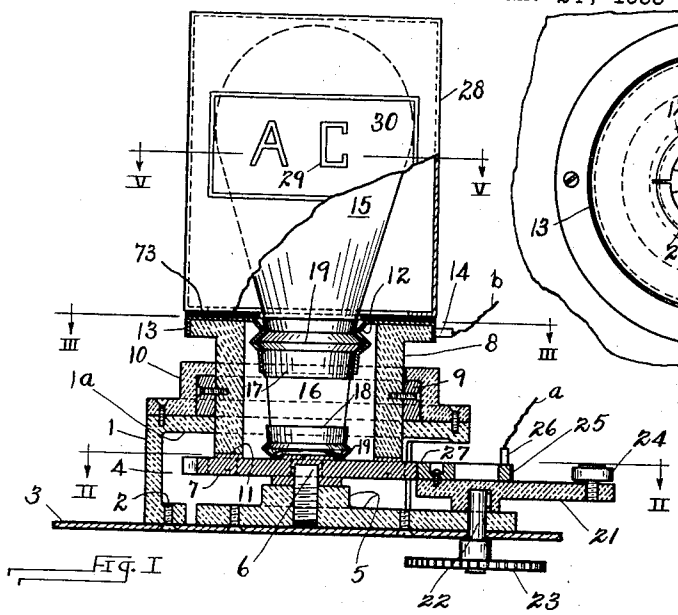


Fig. I

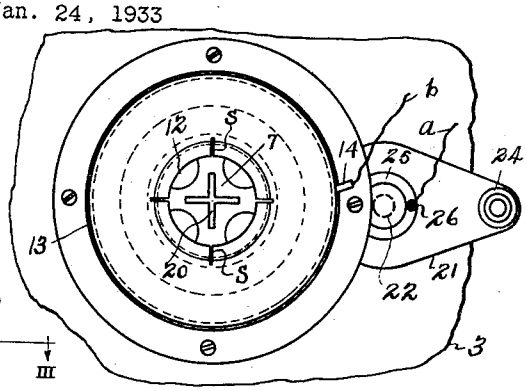


Fig. III

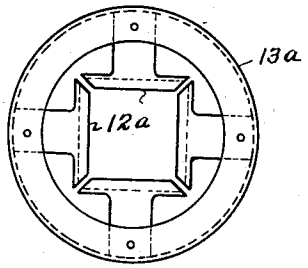


Fig. IV

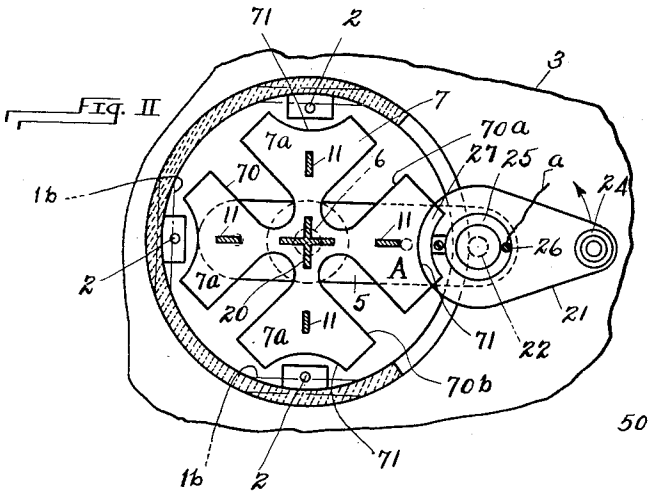


Fig. II

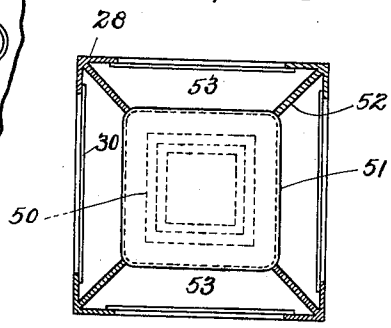


Fig. V

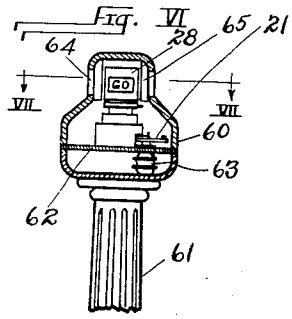


Fig. VI

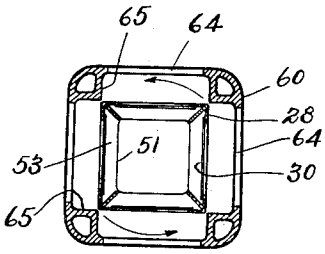


Fig. VII

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ROTARY SOCKET FOR ELECTRIC LAMPS

Henry F. Teichmann, Washington, Pa.

Application January 24, 1933. Serial No. 653,221

15 Claims. (Cl. 40—77)

My invention relates to electric illumination, and consists in a particularly effective rotary socket structure for supporting an electric lamp in communication with an electric supply circuit. The socket structure is such that while rotation is in progress the lamp may readily be maintained in closed circuit with the electric supply line. Alternatively, the socket structure is adapted periodically to open and close such circuit, causing the lamp in successive intervals to glow. The rotation of the lamp may be continuous rotation, or it may be an intermittent rotation through a predetermined range. Accordingly, various lighting effects may be produced for advertising displays, traffic signs, and other apparatus to be illuminated.

In the accompanying drawing an embodiment of the invention is illustrated. Fig. I is a sectional view of my rotary socket structure, the plane of section extending on the axis of the socket. Associated with the socket structure I show, partly in vertical section and partly in side elevation, a display box which is secured over an electric lamp in position of service in the socket. Fig. II is a sectional view of the socket structure, taken on the plane II—II in Fig. I. Fig. III is a view of the socket structure in elevation, as viewed from the plane III—III in Fig. I, the electric lamp and display box being omitted to illustrate the socket structure alone. Fig. IV is a view in plan of one of the elements of the rotary socket structure; in Figs. I and II the upper contact element of the apparatus is in structure adapted for an electric lamp having a base or stem which is circular in cross-section, while the contact element shown in Fig. IV is of modified structure for cooperation with a lamp base of square cross-section. Fig. V is a sectional view of the display box, taken on the plane V—V in Fig. I; the display box shown in Fig. V embodies two elaborations on the structure shown in Fig. I; that is, the electric lamp indicated in plan within the box in Fig. V is shown to be of square cross-section, whereas the lamp shown in Fig. I is round in cross-section, and in Fig. V corner partitions are included in the display box, whereas no partitions are shown in the display box in Fig. I. Fig. VI is a fragmentary view of a pedestal or lamp post having a traffic signal mounted upon its top; the housing of the signal apparatus is shown in vertical section, and illustrates within the housing a practical application of my rotary socket structure. And Fig. VII is a view in cross-section, of the signal apparatus, taken on the plane VII—VII in Fig. VI, and drawn to larger scale.

The socket structure of my invention comprises a base 1 which is adapted to be secured (say by means of screws 2) to any desired support. The base 1 is constructed of porcelain or other insulating material, and the support in this case is a metal plate 3. The plate 3 is shown fragmentarily, and it is to be understood that the plate 3 may constitute a frame or a wall portion of an advertising sign or other apparatus to be illuminated. The base 1 is recessed, providing a chamber 4; secured to the support 3, and located substantially within the chamber 4, is a basal member 5 of porcelain or other insulating material. I have shown the basal member 5 to be an independently-formed piece, but it will be understood that such basal member 5 may be formed integrally with the base 1. A pin 6 is secured in the basal member 5; the pin 6 extends on the vertical axis of base 1, and projects an interval above the face of member 5. A cam 7 of electric-conducting metal is revolubly mounted upon the projecting tip of the pin 6, and, as will presently appear, means are organized with cam 7 to produce its rotation. It will be understood that the cam 7 comprises a driving element of the rotary socket structure.

A cylindrical socket member 8, formed say of porcelain, extends into the base 1, and rests upon the upper face of the cam 7 within the chamber 4. A ring 9 of bearing metal is secured upon the side of socket member 8, and a keeper 10 is assembled over the ring 9 and secured to the base 1. As may be perceived in Fig. I, the base 1 includes a horizontal flange or wall 1a, and the bearing ring 9 is confined between this flange and the keeper 10. Accordingly, the socket member 8 is secured in assembly with the base 1, while being free for rotary movement with respect to the base. The socket member 8 is united with the cam 7, and to this end I provide a plurality of lugs 11 upon the upper face of the cam; the bottom face or lower peripheral edge of the socket member is notched; the lugs 11 lie in such notches, and manifestly the cam 7 and socket member 8 are thus secured together for joint rotation.

At or adjacent the mouth of the socket member 8, I provide a contact piece 12 which is adapted to make contact with one of the electric poles of the lamp installed in the structure. The other electric pole of the lamp rests upon the cam 7, and the cam 7 serves as the second contact piece of the socket structure. Contact piece 12 and cam 7 are electrically isolated from one another and are connected severally to the terminal wires

of an electric supply circuit. Manifestly, a lamp installed in the socket structure is adapted to be energized by the supply circuit.

Specialized means are provided for producing rotation of the cam 7, and for completing electric communication between the rotary cam and one terminal (*a*) of the supply circuit. The upper contact piece 12 of the socket structure is formed integrally with a contact ring 13 secured upon the socket member 8. A brush-contact 14 bears upon the contact ring 13, and serves to maintain electric communication between the second terminal (*b*) of the supply circuit and the contact piece 12 in the socket member, while admitting of rotation of the socket member about the axis of pin 6. The contact piece 12 is shaped, to co-operate with the particular form of the lamp base installed in the structure; that is to say, the contact piece 12 is formed complementary to the upper portion of the lamp base, and serves as a yielding keeper for securing the lamp in position of service, in addition to affording electric connection between one electric pole of the lamp and the supply circuit.

Advantageously, the electric lamp for use in the socket structure is a push-type lamp, that is, a lamp whose contact base may be thrust into secure position in the socket member 8, as distinguished from the usual lamp base which is threaded and must be screwed into position of service. I have shown in Fig. I a lamp 15 whose contact base 16 is of the specialized push-type described in my co-pending application for Letters Patent, Serial No. 646,084, filed December 7, 1932. The body of the base 16 is provided with two metal contact bands 17 and 18, one band 17 being secured upon the base in the region of junction of the base with the hollow body of the lamp, and the other band 18 being secured upon the otherwise free end of the base. Each metal band includes an annular ridge or protuberance 19, and, in assembling the bands upon the lamp, the ridge in each band is filled with cement and the band pressed into position upon the base 16. One terminal of the lamp filament (not shown) is united with the upper band 17, and the other terminal of the filament is united with the lower band 18, so that the bands 17, 18 constitute the two electric poles of the lamp. In many installations the bulb and base of the lamp may be round in cross-section, as is the case in the ordinary lamps in use today, and, in certain other installations which I shall mention, I advantageously employ a lamp whose bulb and base are polygonal in cross-section. For the present, however, I shall confine attention to a round bulb, such as that shown in Fig. I.

The upper contact piece 12 of the structure extends into the socket member 8 and is shaped complementary to the upper contact band 17 on the lamp base 16. The annular ridge 19 on the band 17 normally lies in a groove provided in the contact piece, and serves to secure the lamp base in the socket member 8. The socket is so proportioned with respect to the base of the lamp that the lower contact band 18 rests upon the upper face of cam 7. A central boss 20 is provided upon the cam 7, and, conveniently the boss 20 may be in the form of a cross. A correspondingly shaped indentation is provided in the bottom face of the contact band 18, and, when the lamp is installed in the socket structure, the boss 20 nests in such indentation and serves to secure the lamp and cam for joint rotation. Of course, other means may be provided for so securing the lamp to the cam 7, such, for example, as the well-known socket-and-pin arrangement.

It will be understood, therefore, that the lamp 15 may be readily thrust into position in the socket structure, and then adjusted angularly to such position that the boss 20 nests in the bottom of the lamp. As presently will be more fully explained, the cam 7 constitutes a contact piece which is connected electrically to the wire *a* of the current supply line, and, manifestly, the two contact bands of the lamp, in being severally engaged by the cam 7 and contact piece 12, may be closed in circuit with the electric supply wires *a, b*.

In Figs. I and III the contact piece 12 and contact ring 13 are shown to be fashioned out of one and the same piece of sheet metal, say sheet copper. This unit contact device (12, 13) is fitted upon the head of the socket member 8, and the lamp-supporting portion of the device comprises a tubular portion (to which the numeral 12 is applied) extending into the socket member 8. The wall of the tubular portion 12 of the contact device is slotted (cf. *s*, Fig. III), so that the base 16 of the lamp may be readily thrust into or pulled from position of installation in the socket structure.

The particularly effective mechanism for rotating the socket member 8 and the lamp supported therein comprises a rotary arm 21, which co-operates with the cam 7. As mentioned above, it is desirable to rotate the lamp through predetermined intervals, and successively to make and break electrical connections between the lamp and the supply circuit. To this end I fashion the cam 7 in the form of a Geneva cam. In this case it is desired that the lamp 15 shall be turned on its axis through successive intervals of ninety degrees, and accordingly the cam 7 is provided with four slots 70, equispaced about the axis of pin 6 on which the cam turns. The slots 70 divide the cam into four cam elements or portions 7*a*, and an arcuate bearing face 71 is provided in the peripheral edge of each cam portion 7*a*, in accordance with usual Geneva cam construction. The arm 21 is keyed or otherwise secured upon a shaft 22; the shaft is revolubly mounted in the basal member 5; in this case the shaft 22 extends through the support 3 and is equipped with a gear 23 which is adapted to mesh with the driving gear of a clock, an electric motor, or other source of rotation (not shown). The distal end of the arm 21 carries a wheel 24 which, during each revolution of the arm, swings into one of the slots 70 of the cam. In bearing against the edges of the slot, while the arm 21 continues in uninterrupted rotation, the wheel 24 effects the swing of cam 7 through ninety degrees. That is to say, rotation of the arm 21 in the direction of the arrow in Fig. II swings the wheel 24 into slot 70*a*, and (rotation of the arm 21 being constant) effects the clockwise rotation of the cam 7 through ninety degrees—that is, slot 70*a* is moved into the exact position occupied by the slot 70*b* in Fig. II. Thus the cam 7 is turned through a ninety degree angle upon each revolution of the arm 21, and, of course, the cam 7 remains at rest while the arm 21 is revolving between the points where the wheel 24 enters one of the slots and where, having effected the rotation of the cam 7, it leaves the slot.

The arm 21 carries a contact ring 25 of copper, upon which an electric brush 26 bears; a contact segment 27, whose radially-outward face is

curved upon the same radius as the arcuate recesses 71 in the periphery of the cam 7, is secured upon the arm 21 and in electric communication with the contact ring 25. The brush 26 constitutes the terminal of the wire *a* of the electric supply circuit, and the ring 25 and contact segment 27 are thus maintained in circuit with the current supply while the arm 21 rotates. As, in the operation of the mechanism, the cam 7 is intermittently shifted and the cam portions 7*a* are successively brought to rest in a position adjacent the arm 21 (the position A in Fig. II), the conductor segment 27 carried by the rotating arm 21 makes contact with the arcuate recess 71 in the periphery of the cam portion occupying such position A. The arcuate segment 27 sweeps across the face of the recess 71, during the interval of rest of the cam 7, and in such interval maintains the cam in communication with circuit wire *a*. The segment 27 is so designed that (as the rotation of arm 21 progresses) it swings clear of the cam 7 before the wheel 24 becomes effective in one or another of the slots 70, to produce rotary movement of the cam. It will be understood, therefore, that the cam 7 and the parts carried thereby are intermittently rotated through a fraction of a revolution, and in the period of rest between each movement of the cam the connection to the electric supply circuit is closed and opened. Thus, the lamp 15 is periodically turned through a predetermined angle, and in the periods of rest between successive movements the lamp is energized and caused to glow. Of course, the angles through which the lamp is successively turned may be determined to suit any particular installation, it being merely a matter of modifying the number and relative positions of the slots 70, and correspondingly adjusting the wheel 24 on the arm 21.

A practical application of the invention is illustrated in Fig. I. A display box 28 is mounted over the electric lamp 15, and is secured in any convenient manner to the socket member 8. Ordinarily, a rubber gasket 73 is inserted between the display box and the top of the socket structure, and such gasket serves to insure a snug fit of the parts—protecting the structure from dirt and preventing water from running into the socket in which the lamp is seated. The display box is square in cross-section, and each of its four side walls is windowed and provided with a transparent plate or screen 30 bearing advertising matter 29. Manifestly, the four windowed walls may be provided with several different displays which, during the intermittent movement and illumination of the apparatus, are successively presented to the eye. In a four-sided display box four subjects-matter of advertising may conveniently be displayed. Indeed, I contemplate that a plurality of my socket structures may be arranged in group organization upon the support 3, and that each socket structure may carry a display harmonizing with the displays carried by the several other socket structures. Also, I contemplate that the walls of the socket structure may be formed flat (as indicated by the dotted lines 1*b* in Fig. II) to admit of close juxtaposition of the lamps in group organization. Many remarkable effects and displays are obtainable in such group arrangement of rotary sockets and display boxes.

It will be apparent to the engineer that a line shaft, an endless chain, or other means may be organized with a clock or motor to drive the shafts 22 of a plurality of socket structures in group organization. Additionally, it will be apparent that a common support may be provided for a plurality of the contact brushes 15 of the multiple socket arrangement, and that a common support may be provided for a plurality of the contact brushes 26. Thus, a plurality of lamps (or a plurality of illuminated display boxes) may be caused to turn in concert, to remain at rest for an interval of time, and in such interval to glow. If it be desired that the lamps shall glow continuously (instead of intermittently, as described) the wire *a* of the supply circuit is connected directly to the pin 6 of each socket structure, and consequently the lamps are maintained in closed circuit with the supply wires *a*, *b*.

In certain applications of my invention, I advantageously employ a lamp of polygonal form—a polygonal lamp (say a square lamp) of the structure disclosed in my application Serial No. 646,084, above noted. In the illustrated case the bulb 51 and contact base 50 of the lamp (see Fig. V) are square in cross-section, and Fig. IV illustrates in plan how the upper contact device of the socket structure is modified to accommodate the square lamp base. The modified contact device includes four contact pieces 12*a*, which in this case are separately formed and then united with the contact ring 13*a*. In vertical section the contact pieces 12*a* correspond in form to the contact piece 12 shown in Fig. I, and the contact pieces 12*a* engage the four sides of the square lamp base 50 in the same general manner and with the same effect that the contact piece 12 engages the round base 16, shown in Fig. I.

As shown in Fig. V, the display box 28 is elaborated in structure, to co-operate with the square lamp 51; that is to say, the display box is provided with vertical partitions 52 extending from the respective corners of the square lamp to the adjacent corners of the box. Each side wall of the lamp 51 may be colored differently than the others, so that the four chambers 53 within the box will each be illuminated by light whose color is distinct from the others. Accordingly, one lamp (51) is adapted to constitute the light source of several distinctly colored chambers. Hence, the field of the artist is widened for the production of more elaborate, more effective, and more beautiful illumination and illuminated displays.

Additionally, I contemplate that the invention may be advantageously embodied in a traffic signal. The usual red and green light traffic signals now in use require two electric lamps, one lamp for each color, and in Figs. VI and VII I illustrate how (by the use of my rotary socket structure) a single lamp may be employed, to display lights of two or more colors alternately and for predetermined intervals of time. The traffic signal apparatus includes a housing 60 which is mounted upon a post 61, or is otherwise supported at the intersection of the traffic lanes to be protected. My rotary socket structure is mounted within the housing 60, say upon a support 62, and an adjustable speed motor 63 is organized to drive the socket-turning arm 21. To explain the operation and structure of the traffic signal, I shall assume that only red stop and green go signals are to be used in directing the traffic, while remarking that it will be manifest that a signal displaying three or more colors may be provided.

One pair of the opposed walls of the square lamp 51 is colored green, and the other pair is colored red. Accordingly, one pair of the opposed

chambers 53 is illuminated with red light and the other pair with green light. The screens 30 in the side walls of display box 28 may be provided with the words Go and Stop; that is, the screens in the opposite green chambers 53 each bear the word Go, and the screens in the opposite red chambers 53 each bear the word Stop. The display box 28 is installed upon the socket structure in the signal housing 60; the housing 60 is windowed (64) in each of its four side walls, the windows 64 being aligned or in registry with the screens 30 of the display box. It will be understood, that, as the motor (through suitable reduction gearing) effects rotation of the arm 21 of the socket structure, the display box 28 is caused to turn, alternately bringing red and green illuminated screens 30 into registry with the windows of the traffic signal. Between each of such alternations, the display box 28 remains at rest for an interval of time determinable by the design of the cam 7 and arm 21, or by adjustment of the speed of motor 63. Thus, the usual red and green traffic signals are displayed.

I may remark that the motor 63 in the signal apparatus may be a synchronous electric motor, to the end that a plurality of signals located at successive street intersections in a traffic lane may be operated from a common A. C. supply line. The synchronous motors in the several signal apparatus all operate in harmony with the A. C. supply, and accordingly the signals of the series of apparatus may be timed to operate in desired sequence.

In Fig. VII it will be observed that I provide corner pieces 65 in the housing 60; the corner pieces extend vertically in the housing, and form partitions lying between the corners of the display box 28 and the adjacent corners of the housing 60. These corner pieces serve to prevent the diffusion of the green light showing in one window of the housing 60 with the red light showing in the adjacent windows of the housing. Manifestly, the corner pieces are so arranged that the display box 28 may be freely turned by the rotary socket mechanism, and, as the arrows in Fig. VII indicate, the walls of the housing 60 are located without the radius of rotation of the corners of the display box 28. Obviously, the socket structure of my invention is effective in a traffic signal. And obviously the socket structure may be employed to advantage in many installations other than those described above.

I claim as my invention:

1. In a structure for the installation of an electric lamp, the combination of a base, a cam revolubly mounted in said base, said cam including a plurality of slots extending inward from its periphery, an arm supported for rotation, said arm carrying means which, during a fraction of each revolution of the arm, enters one of the slots in said cam and produces the rotation of said cam through a fraction of a revolution, and a socket member secured to revolve with said cam, said socket member being adapted to support said lamp in communication with an electric supply circuit, and an electric contact member mounted on said cam-revolving arm, said contact member being connected to said supply circuit, and, during the rotation of said arm, being adapted to make and break electrical contact with said cam.

2. A display device comprising the combination of a base, a socket member revolubly mounted in said base, an electric lamp installed in said socket member, means associated with said socket member for connecting the poles of said lamp with an electric supply line, means for producing rotary movement of said socket member, and a display box mounted over said lamp and secured to said socket member, and a plurality of partitions in said display box extending from the walls of said box to the body of said lamp, to provide a plurality of light chambers in said display box.

3. A display device comprising the combination of a base, a socket member revolubly mounted in said base, an electric lamp installed in said socket member, the body of said lamp being polygonal in cross-section providing a plurality of wall areas which may be each distinctly colored, means associated with said socket member for connecting the poles of said lamp with an electric supply line, a display box mounted over said polygonal lamp and secured to said socket member, and means for producing rotary movement of said socket member and the display box, said display box including partitions which extend from the walls of the box to the body of said lamp, whereby said wall areas of the lamp are partitioned off in separate light chambers in said display box.

4. A display device comprising the combination of a base, a socket member revolubly mounted in said base, an electric lamp installed in said socket member, means associated with said socket member for connecting the poles of said lamp with an electric supply line, means for producing the intermittent rotation of said socket member through part of a revolution, a display box mounted over said lamp and secured to said socket member, a plurality of partitions in said display box extending between the walls of said box and the body of said lamp, to provide a plurality of light chambers within the box, and a housing including in its walls a plurality of windows, said socket structure and display device being located within said housing, whereby, as the socket member successively is turned through a part of a revolution, the light chambers in said display box are brought one after another into position adjacent each window in said housing.

5. In an electric lamp installation, the combination of an electric lamp including a stem carrying the two contact poles of the lamp, a structure for supporting said lamp, which structure comprises a stationary base, a socket member revolubly mounted in said base, in which socket member the stem of said lamp is secured, said socket member including two contact pieces connected to the terminal wires of an electric supply circuit, said contact pieces being severally in electric communication with the contact poles of said lamp, and a circuit-breaking and driving mechanism associated with said structure, to produce rotary movement of said socket member and lamp, and to interrupt communication between one of said contact pieces and the electric supply circuit.

6. In a structure for the installation of an electric lamp, the combination of a base, an electric socket member revolubly mounted in said base, said socket member being adapted to support a lamp in communication with an electric supply circuit, a cam of conducting metal secured to said socket member, and means for rotating said cam, said means including a contact member in communication with an electric supply circuit, and said contact member being adapted intermittently to engage said cam.

7. A rotary socket structure comprising in compact assembly a recessed base for attachment to a support, a socket member rotatably secured im-

mediately to said base, a driving element rotatably mounted in said recessed base and connected to said socket member, means organized with said rotary socket member for securing an electric lamp in communication with electric supply lines, and means adapted to be connected to a source of rotation and cooperating with said driving element for rotating said socket member.

8. A rotary socket structure comprising in compact assembly a recessed base for attachment to a support, a socket member rotatably secured immediately to said base, a driving element rotatably mounted in said recessed base and connected to said socket member, means organized with said rotary socket member for securing an electric lamp in communication with electric supply lines, means adapted to be connected to a source of rotation and cooperating with said driving element for rotating said socket member, and means for intermittently interrupting the communication between the lamp in said socket member and said electric supply lines.

9. A rotary socket structure comprising in compact assembly a base for attachment to a support, a socket member rotatably mounted within said base, resilient means in said rotary socket member for securing an electric lamp having a push-type base in communication with electric supply lines, a driving element rotatably mounted in said base and connected to said socket member, and means adapted to be connected to a source of rotation and cooperating with said driving element for rotating said socket member.

10. A rotary socket structure comprising in compact assembly a recessed base for attachment to a support, a socket member rotatably secured immediately to said base, a cam element rotatably mounted in said recessed base and connected to said socket member, means organized with said socket member for securing an electric lamp in communication with electric supply lines, and means adapted to be connected to a source of rotation and cooperating with said cam element for effecting intermittent rotation of said socket member.

11. A rotary socket structure comprising in compact assembly a base for attachment to a support, a socket member rotatably mounted within said base, a cam element rotatably mounted in said base and connected to said socket member, resilient means in said rotary socket member for securing an electric lamp having a push-type base in communication with electric supply lines, and means adapted to be connected to a source of rotation and cooperating with said cam element for effecting intermittent rotation of said socket member.

12. A display device comprising a stationary base, an electric lamp supported in communication with electric supply lines, a display box rotatably mounted over said lamp, said display box including a plurality of distinctly illuminated compartments before which display matter is supported, and means for rotating said display box through successive predetermined intervals.

13. A display device comprising a stationary base, an electric lamp supported in communication with electric supply lines, a rotatable display box mounted over said lamp, said display box including a plurality of light compartments, the outer walls of said compartments carrying several subjects matter for display, a stationary windowed housing within which said display box is located, and means for rotating said display box through successive predetermined intervals for bringing the subject matter for display carried by said box successively into registry with the windows of said housing.

14. A display device comprising a stationary housing including in its wall or walls a plurality of windows, an electric lamp supported in said housing, a display box carrying a plurality of displays mounted over said lamp and within said housing, a plurality of partitions in said display box extending from the walls of the box to the body of said lamp, to provide independent light chambers behind each of said displays, and means for rotating said box through successive intervals for bringing the displays into registry, in predetermined cycle, with the windows of said stationary housing.

15. A display apparatus comprising a stationary housing including in its wall or walls a plurality of windows, an electric lamp supported in said housing, a rotary display device carrying a plurality of displays mounted over said lamp and within said housing, a plurality of partitions in said display box extending from the walls of the box to the body of said lamp, to provide independent light chambers behind each of said displays, means for rotating said device through successive intervals for bringing illuminated displays in predetermined cycle severally into registry with the windows of said housing, and means in said housing for shielding the light of the display positioned before one window from the light of the displays positioned before adjacent windows.

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