

Apr. 17, 1923.

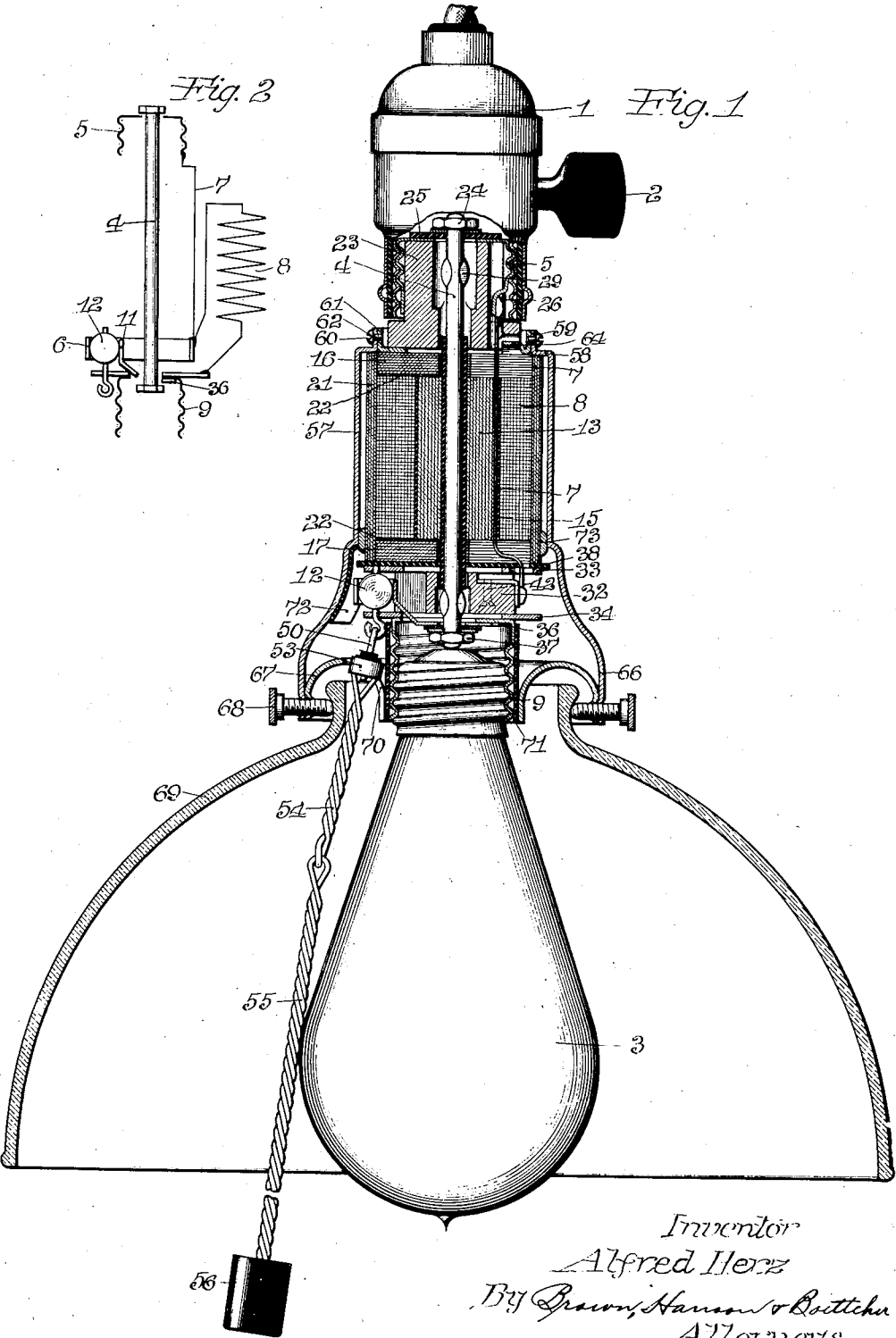
1,452,115

A. HERZ

DIMMING MECHANISM

Filed July 24, 1916

4 Sheets-Sheet 1



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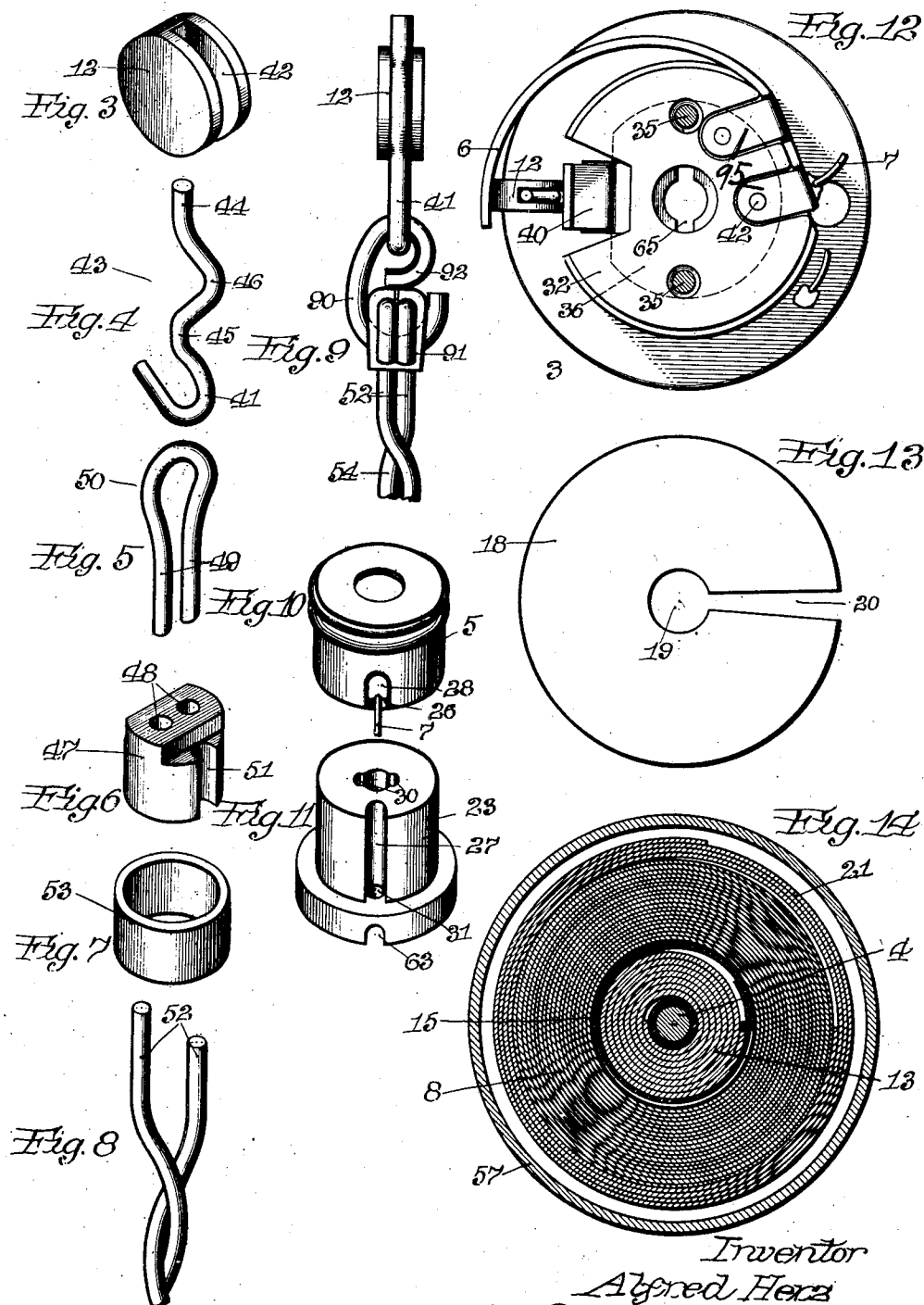
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DIMMING MECHANISM

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4 Sheets-Sheet 2



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DIMMING MECHANISM

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4 Sheets-Sheet 3

Fig. 16

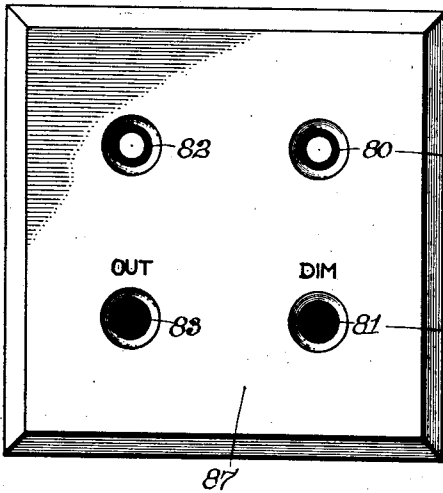


Fig. 17

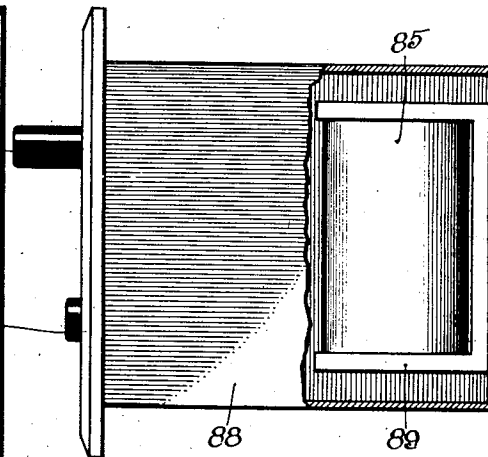
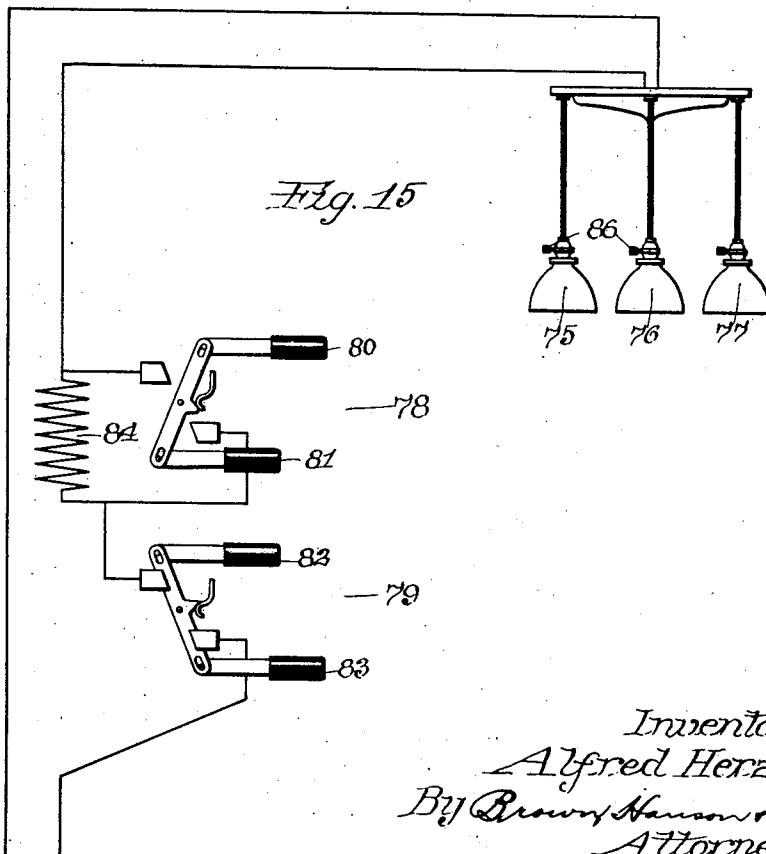


Fig. 15



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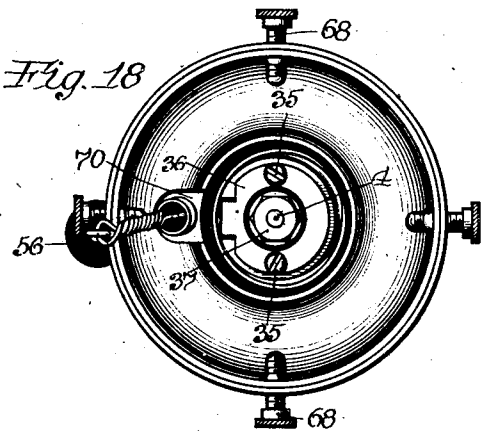
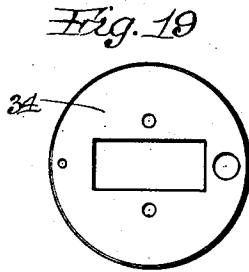
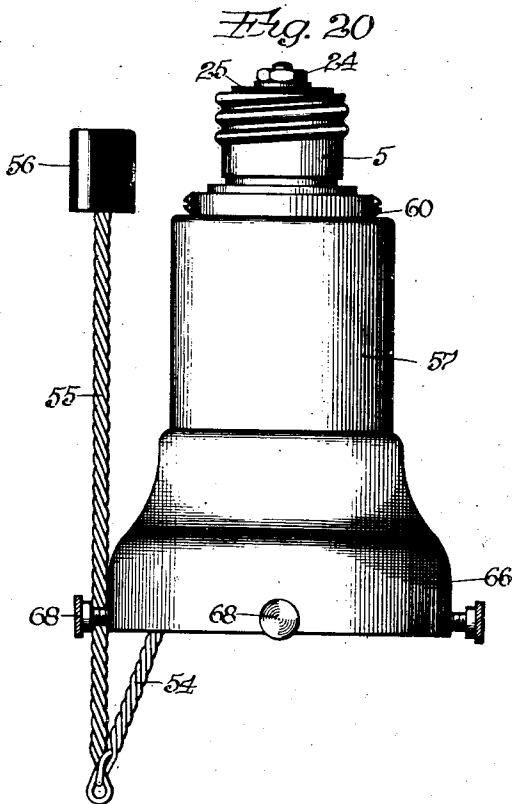
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DIMMING MECHANISM

Filed July 24, 1916

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

ALFRED HERZ, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO ELECTRIC AUXILIARIES COMPANY, OF DOVER, DELAWARE, A CORPORATION.

DIMMING MECHANISM.

Application filed July 24, 1916. Serial No. 110,953.

To all whom it may concern:

Be it known that I, ALFRED HERZ, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Dimming Mechanism, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

The present invention relates to dimming mechanism for electric lamps and the like.

While I shall describe the invention with reference to the dimming of electric incandescent lamps it is to be understood that the device is applicable to other uses and purposes.

The present application is divisional in part of my copending application, Serial No. 15,278, filed March 18th, 1915, which has since matured into Patent No. 1,195,137, granted on August 15th, 1916.

The primary object of my invention is to provide an improved structure of this class which is capable of rapid and inexpensive manufacture and reliable and satisfactory in operation. Another and further object of the invention is to provide an improved form of inductance coil. A further object is to provide an improved switching arrangement for switching the inductance coil into and out of circuit with the lamp, or other object. Other and further objects will be apparent from the following specification and claims.

In the accompanying drawings in which I have illustrated one embodiment of my invention—

Figure 1 is a vertical longitudinal section of the dimming mechanism showing its relation to the usual key socket and the usual incandescent lamp;

Figure 2 is a diagram of the circuit connection employed in the structure shown in Figure 1;

Figures 3 to 8 are isometric views of details of the dimming switch prior to assembling;

Figure 9 is a view of a modified form of insulating joint in the switch member;

Figure 10 is an isometric view of the sheet metal connector forming a part of the plug

member at the upper end of the dimming device;

Figure 11 is a similar view of the porcelain core forming a part of the connecting plug;

Figure 12 is a plan view of the dimming switch;

Figure 13 is a plan view of one of the discs forming the head of the inductance coil;

Figure 14 is a cross sectional view taken across the body of the inductance coil.

Figure 15 is a diagram of a modification;

Figure 16 is a front elevation of the switch plate;

Figure 17 is a side elevation of the same showing the inductance coil contained within the metal switch box;

Figure 18 is a bottom plan view of the device of Figure 1 with the shade removed and the handle folded up in position for shipping.

Figure 19 is a plan view of one of the bearing plates for the movable switch element.

Figure 20 is a side elevation of the same; and

In the preferred form of my device, as shown in Figure 1, the dimming mechanism is constructed as a unitary link between the incandescent lamp 3 and the usual key socket 1, which key socket has any suitable key switch such as 2 for switching on and off the current.

To accomplish this linkage or connection most easily the dimming device is provided with a suitable plug which screws into the key socket 1 and a suitable screw socket which makes connection with the terminal of the lamp 3. A central post 4 forms a straight connection through the dimming device from one terminal of the key socket 1 to the corresponding terminal of the lamp 3. The screw threaded metal thimble 5 on the plug is connected to a switch spring 6 by a suitable conductor 7. One terminal of the winding 8 of the inductance coil is connected to the switch spring 6 and the other terminal of the winding is connected to the screw socket 9 and to the switch spring 11. The movable switch block or member 12 is

adapted to make and break connections between the springs 6 and 11 thereby opening and closing a short circuit about the winding 8 which is connected serially in circuit with the lamp 3.

The inductance coil comprises a central core of magnetic material 13 which is formed of a sheet of silicon steel rolled up spirally into a generally cylindrical shape as shown in Figure 14. The central part of the core 13 is hollow to permit the passage of the bolt 4 therethrough. A layer of insulation 15 is interposed between the core 13 and the winding 8 which lies outside of it. The ends of the core 13 rest against magnetic end plates 16 and 17, these end plates being formed of a plurality of discs 18, as shown in Figure 13, having a central slot or aperture 19 for the bolt 4 and having a radial slot or aperture 20 for preventing eddy-currents and for permitting passing of the circuit wires therethrough. An outer shell 21 of magnetic material encircles the end plates or heads 16 and 17, this shell being formed of a sheet of silicon steel wound spirally about said head and about the winding 8. Discs of insulation 22 lie between the heads 16 and 17 and the winding 8. These discs of insulation are interposed between the central core 13 and the heads 16, 17 in order to form air gaps for increasing the leakage effect of the core. The thickness of these discs 22 may be varied in order to obtain a suitable value of inductive action. The plug which is secured to the upper end or head of the inductance coil is provided with a porcelain core 23 (see Figures 1 and 11). A metallic threaded thimble 5 fits closely over the top of the plug 23 and is held thereupon by means of the bolt 4 which is provided with a suitable nut 24 and an insulating washer 25. The thimble 5 is provided with a depression 26 which is adapted to rest in the slot 27 of the core 23 and thereby prevent relative turning between these two elements. The conductor 7 is soldered into the depression 26 as shown in Figure 10, and the solder 28 forms additional stiffening means for the depression 26 so as to form a solid key in the slot 27. The bolt 4 is stamped as shown in Figure 1 to provide the laterally projecting keys 29 which fit into the wings 30 of the central aperture through the porcelain core 23. The conductor 7 passes down thru an opening 31 in the porcelain core 23 through the radial slot 20 in the head 16 along the central core 13 through the radial slot in the head 17 and is connected to the spring 6 as is shown in Figure 12. A porcelain block 32 has secured upon each end thereof metallic plates 33 and 34 which are suitably held in place by bolts 35 passing through the block 32. These metal discs 33 and 34 are

similar in all respects, being struck from the same die. The socket member 9, the metal plate 36, the plates 33 and 34 and the porcelain block 32 are all held together by means of the screws 35. These parts are secured to the bottom head 17 of the inductance coil by means of the bolt 4 which is provided at its lower end with the nut 37. A plate of insulation 38 is interposed between the inductance coil and the above mentioned parts.

The plate 36 which is in electrical connection with the socket member 9 is provided with an extension or spring finger 11 which projects into a notch formed in the side of the porcelain block 32. The switch spring 6 which lies outside of the spring 11 is mounted upon the block 32 by means of a pair of lugs 95 (see Fig. 12) which are set into the porcelain block 32 and fastened by suitable screws 42 as shown in dotted lines in Figure 1. The spring 6 is thus insulated from the plates 33 and 34. A movable switch block or switch member 12 forms in connection with the springs 6 and 40 a snap switch for short-circuiting the winding 8 of the inductance coil. The movable switching block 12 is mounted on a suitable wire pintle which has bearings in both of the plates 33 and 34, and which is provided with a hook 41 below the plate 34 and through this hook is secured a suitable handle for operating the switch block 12.

The switch block 12, as shown in Figure 3, comprises a short section of round metal rod which has a notch milled into the side thereof as shown at 42 in Figure 3, this notch being cut a slight distance beyond the center so that the wire pintle 43 shown in Figure 4 may lie in the notch 42 with the bearing portions 44 and 45 lying axially of the block 12, as shown in Figures 1 and 12. The hump or bent portion 46 lies within the notch 42 as the notch is of just sufficient width to receive the thickness of the wire from which the pintle is composed. In assembling the block and the pintle, the pintle is laid in a notch and the block is thereafter given a sharp blow with a hammer and if desired, the whole may then be dipped in melted solder. The pintle is thus secured firmly to the block thereby preventing the wire from coming loose from the block, as has always been the case heretofore in devices of this character. It is obvious that the block 12 may be cut from square stock or from any other kind or type of stock, the important point in this connection being the firm grip between the block and the wire, this grip being so firm that the wire will twist off before it loosens in the block. A suitable operating handle is connected to the hook 41 with an insulating joint interposed to prevent the operator from receiving a shock in case the bare or exposed parts

are touched. This insulated joint is secured by the employment of a lava or porcelain block 47 shown in Figure 6. The insulator 47 is provided with two holes 48 running lengthwise through the same to receive the two legs 49 of the loop or staple shown in Figure 5. A pair of grooves 51 are formed in the side of the insulator 47 to receive the two ends of the twisted wires 52. In assembling these parts the loop or staple 50 is inserted into the insulating block 47 and the ends of the legs 49 are riveted or flattened. The ends of the wire 52 are also flattened to prevent these wires from being withdrawn from the block of insulation 47 and the ring 53 shown in Figure 7 is then placed over the ends of the wire 52 and the joints may then be dipped in solder to solder the ring 53 to the wires 52 to hold the entire structure firmly together.

The wire 52 is bent into a loop or hairpin shape and is then twisted and a similar wire which is linked with the end of the wire 54 is twisted and provided at its lower end with a suitable handle 56 for operating the switch block 12. The co-operating loops of the wires 54 and 55 from a universal joint which permits the handle or finger member 56 to lie at any suitable position with respect to the lamp bulb 3 and to transmit motion to the switch block 12. In addition, the flexible or universal joint between the rods formed by the wires 54 and 55 permit the portion 55 to be folded back toward the main body of the device to aid in packing for shipment. This is clearly illustrated in the accompanying figures.

The induction coil and the switch mechanism are enclosed by a suitable casing or shell member 57 which is provided with a shoulder 58 and a flange 59 at its upper end. The flange 59 is secured by means of screws 60 to the flange 61 of a disc 62 which is clamped between the core 23 of the plug and the top of the inductance coil. As shown in Figure 11, the bottom of the plug 43 is provided with a notch 63 in the lower surface thereof and a projecting portion 64 lies in the notch 63 and prevents turning of the disc and shell with respect to the core. Inasmuch as the core is secured by means of the wings 29 punched in the rod 4, which wings lie in the eccentric parts 30 of the bore of the core block 23 and since the thimble 5 is also keyed to the core block 23, it is apparent that relative rotation between these parts is prevented. The lower end of the bolt 4 is also provided with suitable wings stamped up from the sides thereof and these wings lie in the narrow part of the bore 65 in the block 32 as shown in Figure 12 and since the socket 9 and the plates 33 and 34 are secured to the block 32, relative motion of these parts is also prevented. This is of importance as it prevents screwing in or out of

the lamp into the socket 9 or of the plug into the socket 1 from loosening or disconnecting the parts.

The lower end of the casing 57 is formed into a bell shaped extension 66 and between the rim of the bell shaped member 66 and the socket 9 there is placed a circular channel member 67 which has its outer edge flush with the lower end of the bell member 66. Supporting screws 68 are threaded through the bell member and the channel 66, 67 to support a suitable shade 69. The top of the shade 69 is of considerably greater diameter than the socket 9 and of less diameter than the outer edge of the bell member 66 and of the channel member 67 so that there is provided a free passage for air and ventilation over the top of the shade 69 and under the bottom of the bell member 66. The channel member 67 is apertured as shown at 70 to facilitate the assembly of the switch stem 54, 55. A suitable cylinder of insulation 71 lies between the socket 9 and the inner edges of the channel member thereby preventing accidental contact between these parts and also closing off the opening 70 in the channel member 67. A sheet of insulation 72 is placed upon the inside of the bell shaped member 66 adjacent the switch members 6, 11 and 12 to guard against accidental contact.

As I have found that in operation the inductance coil is likely to produce a humming sound and since this may be accentuated by the shell 57, I have placed a washer 73 of sound deadening material between the shell 57 and the outside of the inductance coil. At the same time it serves as a suitable support for spacing the shell 57 from the inductance coil.

In Figures 15, 16 and 17 I have illustrated the inductance coil of my invention as applied to a cluster of lights suspended from a ceiling or the like.

The lamps 75, 76 and 77 are all connected in parallel to each other and in series with the two switches 78 and 79. The two switches 78 and 79 are similar in construction being of the familiar push-operated snap-action type provided with the two push buttons 80 and 81 for operating the switch 78 and the buttons 82, 83 for operating the switch 79. Any suitable form of snap action may be employed as this forms no essential part of the invention. The switch 78 is shunted about the winding 84 of the inductance coil 85 which is included serially with the lamps 75, 76 and 77. When the switch 79 and the switch 78 are closed, all of the lamps are illuminated with the maximum brilliancy. When the switch 79 is closed and the switch 78 is opened, the current is compelled to pass through the winding 84 of the inductance coil 85 and all of the lamps 75, 76 and 77 are dimmed

to a minimum brilliancy. If thereafter one of the lamps 75, 76 or 77 be turned off completely as by means of the key switches 86, the remaining lamps will become slightly brighter.

For convenience in installation the two switches 78 and 79 are connected under the same cover plate 87 and provided with a metal outlet or switch box 88 within which is supported the inductance coil 85 as by means of the bracket 89. I have shown the inductance coil 85 as supported in the bottom of the box 88 although in the normal construction this coil may be placed at one side of the switch 78 and 79 under the same cover plate and thus be more accessible for inspection and repairs. The structure of the inductance coil 85 is substantially the same as that shown in connection with Figure 1.

In Figure 9 I have illustrated a different manner of securing an insulating joint between the stem 54 and the pintle 43. The ends 52 of the wire in this case are brought up parallel and bent over the lower limb of a link 90, the upper end of which is hooked or looped into the hook 41 of the pintle 43. A layer or layers of paper or similar insulating material is placed between the end 52 of the wire 54 and the lower limb of the link 90. This insulating material 91 laps over the top of the wires 52 preventing contact with the upper limb 92 of the link 90. It will be noted that the link 90 is formed in the shape of the conventional Figure 9, the loop being connected to the hook 41 and the tail of the figure forming a support for the bent over ends of the wire 54. In each case it is to be noted that the connection between the hook 41 and the insulated joint forms a flexible coupling or universal joint.

What I claim is:

1. In combination an inductance coil, a plug mounted on one end of said coil, said plug comprising a core of insulating material having a grooved bore therethrough, a switch mounted on the other end of said inductance coil, said switch having a block of insulating material having a grooved bore therethrough and a bolt having flat portions engaging said grooved bore and preventing said core from turning.

2. In combination a core of insulation, said core having a bolt therethrough, said bolt being keyed to said core, a coil secured to said core by said bolt a connecting thimble secured upon the outside of said core, said thimble having a depressed portion lying in a groove in said core and a wire forming a terminal of said coil soldered in said depressed portion.

3. In combination a core of insulation, said core having a bolt therethrough, said bolt being keyed to said core, a connecting

thimble secured upon the outside of said core, said thimble having a depressed portion lying in a groove in said core and a wire soldered in said depressed portion, an inductance coil, a disc clamped between said core and said inductance coil, said disc having a flanged periphery and a casing secured to said flanged periphery.

4. In combination a coil, said coil having a magnetic shell thereabout, a disc of smaller diameter than said shell secured to said shell adjacent one end thereof, said disc having a flanged periphery, a casing having a cylindrical portion and a flange at one end of said cylindrical portion, said flange being adapted to be united with the flange of said disc, said magnetic shell lying within said cylindrical portion and a sound deadening member lying between the cylindrical portion and said magnetic shell.

5. In combination an inductance coil having a flat ended magnetic spool or core, an enclosing shell surrounding said magnetic core, said enclosing shell having a flaring bell shaped portion, switch mechanism for changing the circuit connection of said coil, said switch mechanism being clamped to the flat end of said magnetic spool or core and being enclosed by said bell shaped portion of the enclosing casing said bell shaped portion being adapted to embrace a suitable shade member.

6. In combination a cylindrical inductance coil, an enclosing shell for said coil, said shell having a cylindrical portion adapted to enclose the inductance coil and having a bell shaped depending portion, a switch for changing the circuit connection of said coil mounted on one end thereof, a socket for forming connection with a lamp, said socket being partially enclosed by said bell shaped extension and a circular channel closing the space between said bell shaped extension and said socket, said channel being adapted to receive the upper end of a shade.

7. In combination an enclosing casing having a cylindrical portion and a depending bell shaped portion, a socket adapted to receive a lamp mounted at the open end of said bell shaped portion, current varying means in the cylindrical portion, a switch in said bell shaped portion for controlling the current varying means, said switch having an operating handle extending below said socket, said handle being adapted to be rotated to operate said switch, and a universal joint in said operating handle to permit the handle to be folded back along the side of said enclosing shell or casing.

8. In combination an enclosing shell or casing having a cylindrical portion and a bell shaped depending portion, an induc-

5 tance coil in said cylindrical portion, a switch in said depending portion, a socket adapted to receive an electric lamp at the open end of said depending portion, said switch being adapted to change the circuit connection of said inductance coil with respect to said socket, a channel member closing the open annular space between said depending bell shaped portion and said socket, 10 said channel having an opening or slot therethrough, an operating handle projecting through said channel member, said operating handle having flexible portions, said handle being adapted to be rotated to operate 15 said switch.

9. In combination an enclosing shell or casing having a cylindrical portion and a bell shaped depending portion, an inductance coil in said cylindrical portion, a switch in 20 said depending portion, a socket adapted to receive an electric lamp at the open end of said depending portion, said switch being adapted to change the circuit connection of said inductance coil with respect to said 25 socket, a channel member closing the open annular space between said depending bell shaped portion and said socket, said channel having an opening or slot therethrough, an operating handle projecting through said 30 channel member, said operating handle having flexible portions, said handle being adapted to be rotated to operate said switch, and an insulating joint between said switch and said operating handle.

35 10. In combination an inductance coil, a circular prismatic block of insulation mounted on said inductance coil, a pair of switch springs mounted on the circular side of the block of insulation, a switch block 40 pivoted between said springs, said switch block comprising a wire pintle member and a notched block member, said pintle having a curved portion lying in said notch and having straight portions extending axially 45 from said block.

11. In combination an inductance coil, a plug secured to one end of said coil, said plug being adapted to make connection with the usual key socket, a socket secured to 50 the other end of said inductance coil, said socket being adapted to be secured to the usual incandescent lamp, switch mechanism lying between said socket and said inductance coil, a casing for said coil, said switch 55 and said socket, an operating shaft extending from said casing and adapted to hang at the side of said lamp, said operating shaft having a handle on its outer end and having a flexible joint, said flexible joint 60 permitting a portion of said shaft to be folded along the side of said casing.

12. In combination an inductance coil, a generally prismatic block of insulation, mounted on said coil, a switch spring partially encircling said block, said block hav-

ing a groove in one side thereof, a switch spring projecting into said groove, a metallic plate upon each side of said block, and a movable switch member pivoted between said switch springs in said plates and adapted to make connections between said springs. 70

13. In combination, a lamp, a switch, and an inductance coil, said inductance coil comprising a magnetic circuit and an electric circuit, said electric circuit being adapted to be switched into connection with the lamp, 75 said magnetic circuit comprising a central cylindrical core laminated spirally, disks of magnetic material at the ends of said core, said disks being laminated at right angles to the axis of said core, one of said disks and said core being out of magnetic contact. 80

14. In combination, a lamp, a switch, and an inductance coil comprising a magnetic circuit and an electric circuit, said circuits 85 interlinking with each other, said electric circuit being adapted to be put into connection with the lamp by said switch, said magnetic circuit comprising a central substantially-cylindrical core laminated spirally, 90 circular disks of magnetic material laminated at right angles to the axis of said core, said disks and said core being magnetically separated.

15. In combination, a lamp, a switch, and an inductance coil comprising a pair of disks laminated in parallel planes, a substantially-cylindrical core laminated spirally at right angles to said parallel planes, disks of insulation interposed between said first disks 100 and said core and a winding on the core adapted to be put into circuit with the lamp by means of the switch.

16. In combination, a lamp, a switch, and an inductance coil comprising a pair of circular disks laminated in parallel planes, a central generally-cylindrical core laminated spirally at right angles to said parallel planes, said core and one of said disks being separated by a disk of insulation, and a 110 winding for said core, said winding being confined between said disks, said winding being adapted to be put into circuit with the lamp by means of said switch.

17. In combination, a lamp, a switch, and an inductance coil comprising an incomplete magnetic circuit and an electrical circuit, said circuits interlinking with each other, said electric circuit being adapted to be put into connection with the lamp by means of said switch, said magnetic circuit comprising a central generally-cylindrical core laminated spirally disks at right angles to the axis of said core, and a shell of magnetic material connecting said disks. 125

18. In combination, a lamp, a switch, and an inductance coil comprising a central cylindrical core of magnetic material, disks of magnetic material adjacent the ends of said core, and a shell of magnetic material con- 130

necting said disks, said shell being laminated spirally, said inductance coil being adapted to be put into circuit with the lamp by means of said switch.

19. In combination, a lamp, a switch, and an inductance coil comprising a central cylindrical core laminated spirally, end disks laminated at right angles to the axis of said core, an outer shell connecting said disks, said shell being laminated spirally, and a winding surrounding said central core and being enclosed by said end disks and said outer shell, said winding being adapted to be put into circuit with the lamp by means of said switch.

20. In combination, a lamp socket, a switch, and an inductance coil, comprising a central cylindrical core and an outer cylindrical shell, said core and said shell being laminated spirally, said inductance coil being adapted to be put into circuit with the lamp socket by means of said switch.

21. In combination, a lamp socket, a switch, and an inductance coil, said coil comprising a central cylindrical core, said core being laminated spirally, end plates of magnetic material, said plates being laminated at right angles to the axis of said core, radial slots cut in said plates, said slots preventing circulating currents, said inductance coil being adapted to be put into circuit with the lamp socket by means of said switch.

22. In combination a light dimming mechanism having a plug and a socket and a switch for operating the same, a casing surrounding said mechanism and said switch, a light secured to said socket and a switch handle for said switch, said handle projecting below said electric light.

23. In combination a light dimming mechanism having a plug and a socket, an electric lamp connected to said socket, said mechanism having a switch for operating the same, a casing surrounding said mechanism and switch and a handle for said switch, said handle projecting through said casing and having a flexible portion.

24. In combination an inductance coil, a block of insulation mounted on the coil, a lamp socket connected to said block of insulation, a switch, circuit connections to said socket including said switch, said switch having a rotatable handle, said handle projecting downward below said socket.

25. In combination an inductance coil, a block of insulation mounted on said coil, a socket mounted on said block, a switch for said coil, circuit connections to said socket including said switch and coil, a rotatable element for operating said switch, a controlling handle connected to said rotatable element, said handle projecting down below said socket.

26. In combination an inductance coil, a block of insulation mounted on the coil, a socket mounted on said block, a switch for said coil mounted on said block, connections to said socket including said switch and said coil, said switch having a rotatable element for operating the same, a handle for operating said element, said handle having a flexible portion extending beyond said socket and in the same direction.

27. In combination a light dimming mechanism having a plug and a socket, an electric lamp in said socket, said dimming mechanism having a switch for operating the same, a casing surrounding said mechanism and switch, said switch having a handle lying outside of said casing and a stem connecting said handle and switch, said stem having a flexible portion.

28. In combination, an inductance coil having a substantially flat ended magnetic spool or core, an enclosing shell for said core, a switch clamped against the lower end of said core, a socket secured below said switch, said shell having a cylindrical portion for the core, and a flared skirt portion enclosing the switch and socket and being adapted to embrace a suitable shade member.

In witness whereof, I hereunto subscribe my name this 20th day of July, A. D. 1916.
ALFRED HERZ.