Feb. 12, 1924. 1,483,710

G. L. BLACK

ELECTRICAL VARIED LIGHT APPARATUS

Filed April 30, 1919 4 Sheets-Sheet 1

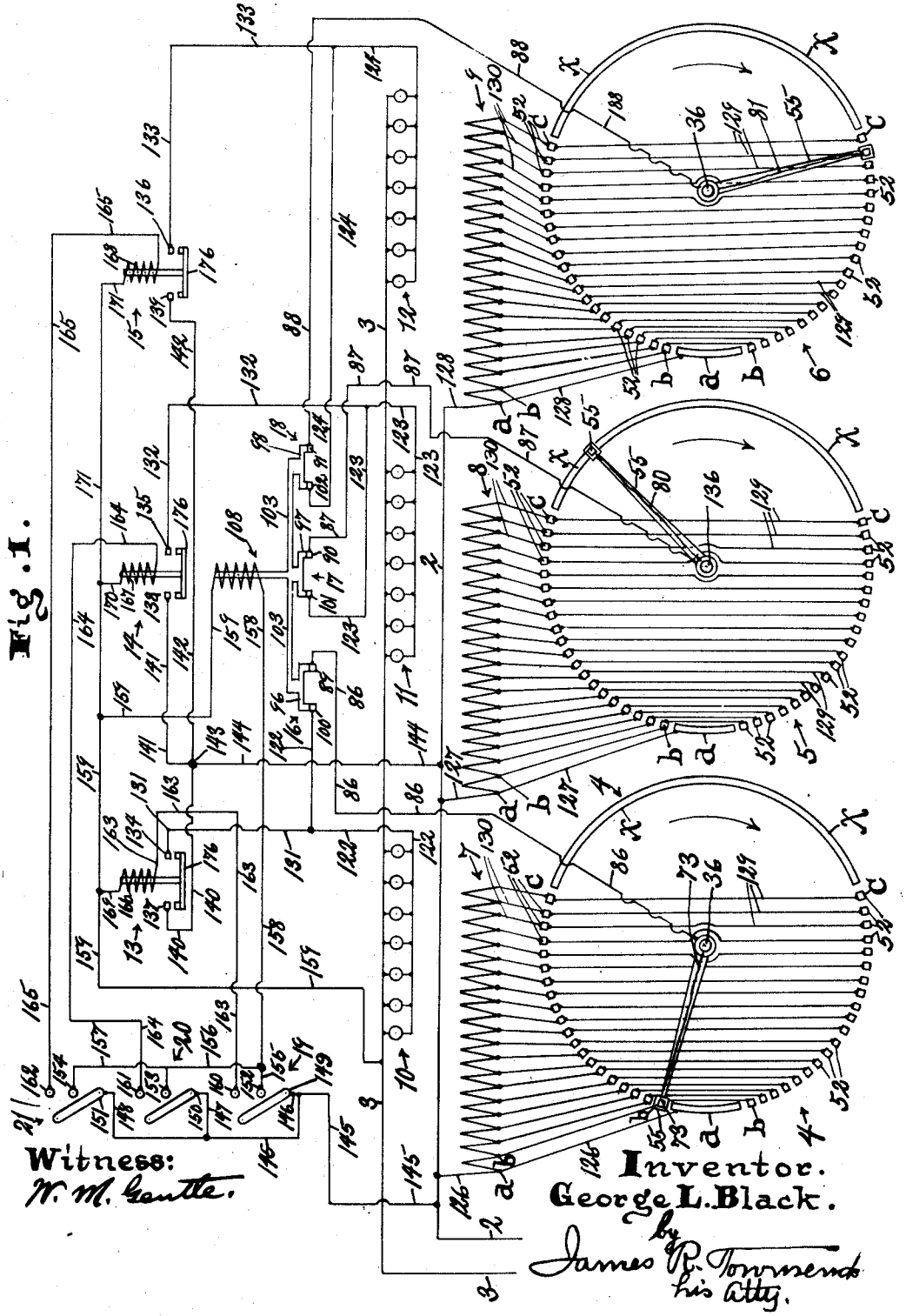


Fig. 1.

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ELECTRICAL VARIED LIGHT APPARATUS

Filed April 30, 1919 4 Sheets-Sheet 2

Fig. 3.

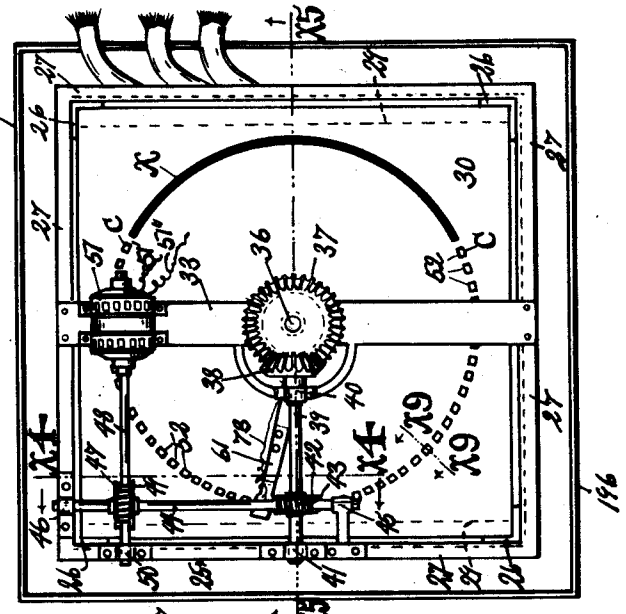


Fig. 4.

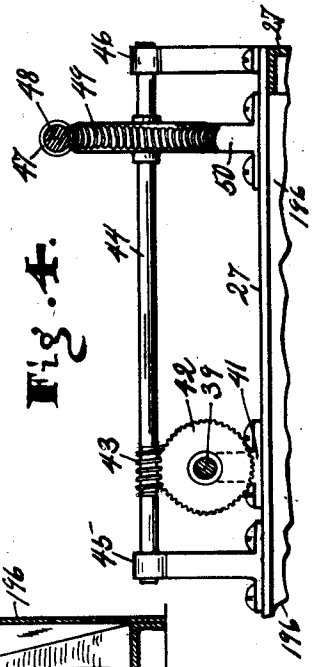
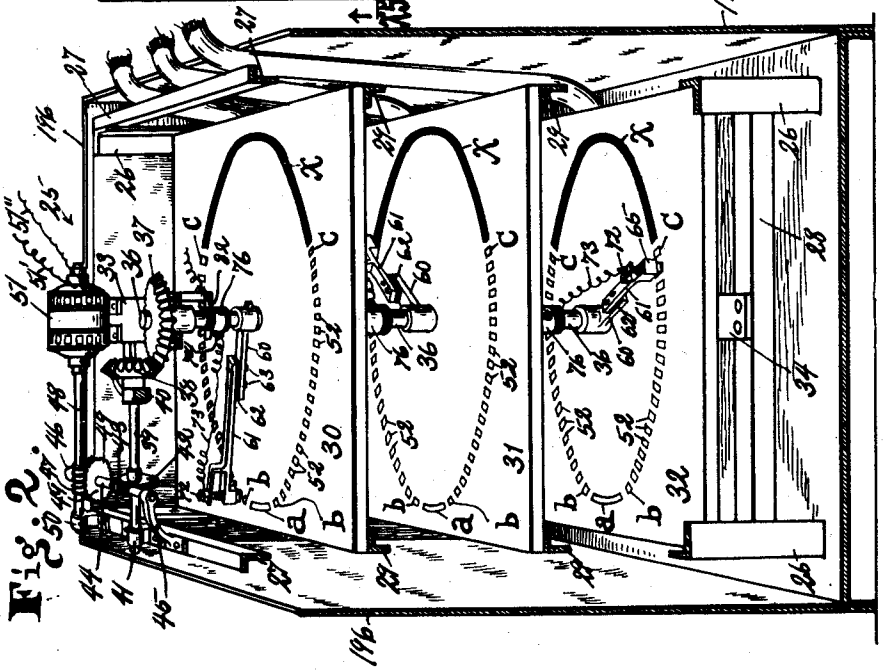


Fig. 2.



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ELECTRICAL VARIED LIGHT APPARATUS

Filed April 30, 1919 4 Sheets-Sheet 3

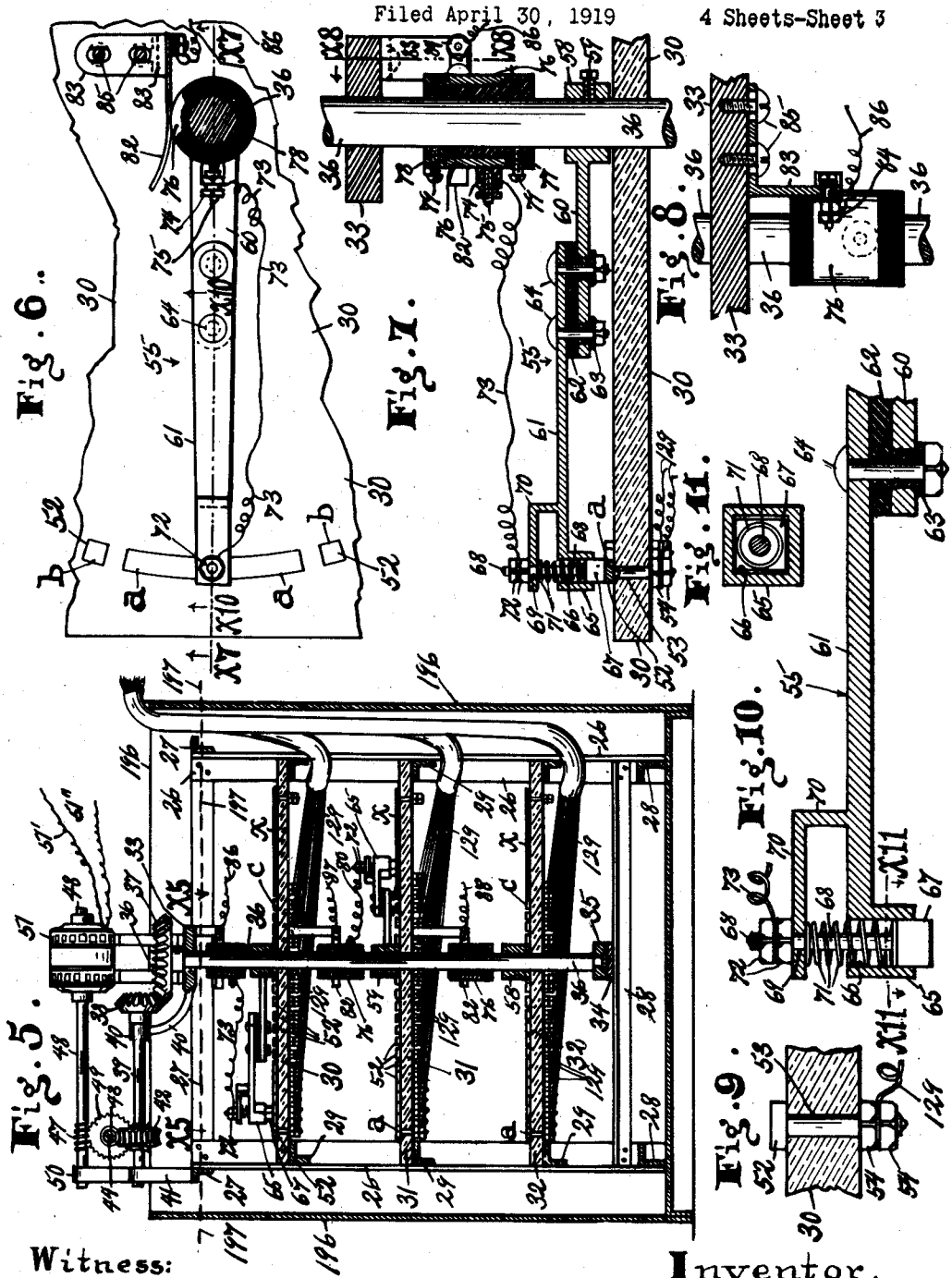


Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 11.

Fig. 10.

Fig. 9.

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ELECTRICAL VARIED LIGHT APPARATUS

Filed April 30, 1919 4 Sheets-Sheet 4

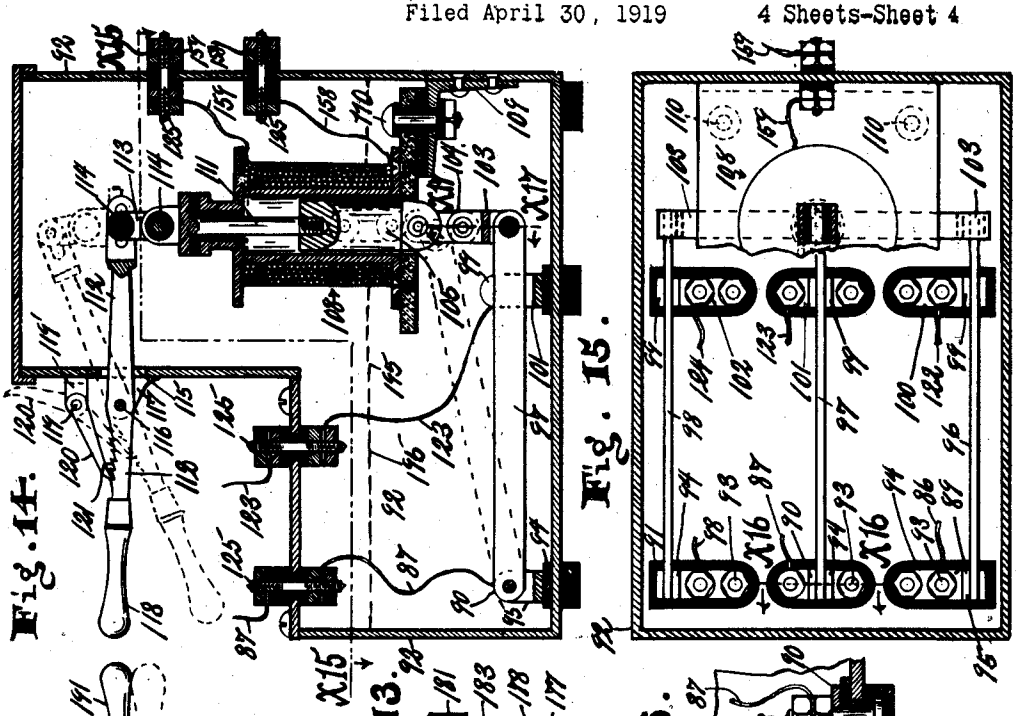


Fig. 14.

Fig. 15.

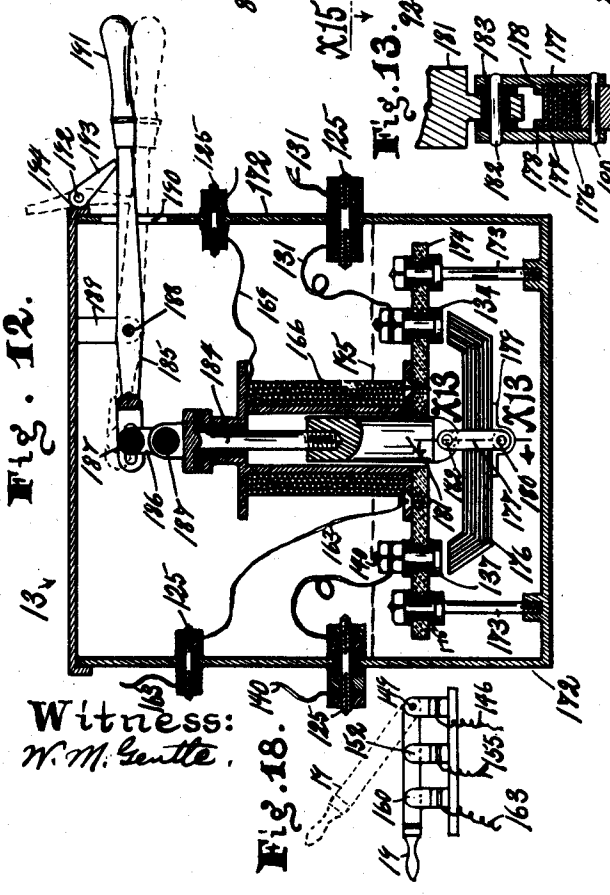


Fig. 12.

Fig. 13.

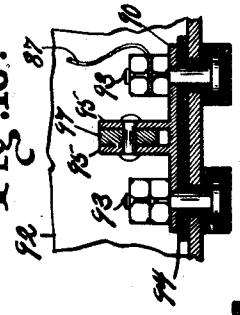


Fig. 16.

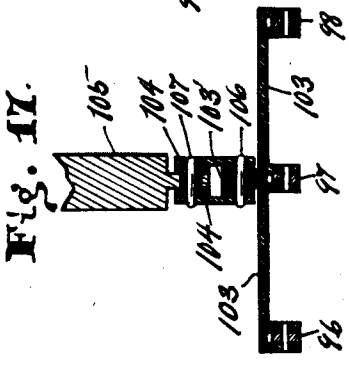


Fig. 17.

Fig. 18.

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Patented Feb. 12, 1924.

1,483,710

UNITED STATES PATENT OFFICE.

GEORGE L. BLACK, OF SAN BERNARDINO, CALIFORNIA.

ELECTRICAL VARIED-LIGHT APPARATUS.

Application filed April 30, 1919. Serial No. 293,875.

To all whom it may concern:

Be it known that I, GEORGE L. BLACK, a citizen of the United States, residing at San Bernardino, in the county of San Bernardino and State of California, have invented a new and useful Electrical Varied-Light Apparatus, of which the following is a specification.

An object of this invention is to provide for theatrical, advertising, amusement, and other purposes, means whereby varied lights may be produced in regular course automatically and out of course by manual operation for numerous and varied lighting effects.

Another object is to effect these results by comparatively simple and inexpensive means that are regularly installed by electricians, from stock or easily obtained materials.

An object is to provide apparatus of this kind by means of which the light from the lighting system may be gradually dimmed and gradually increased, and whereby the different colors of the spectrum may be blended.

An object is to make provision for blending the colors as desired.

The invention is primary, broadly new and pioneer in various features, amongst which may be mentioned an electric dimmer, comprising a revolving brush and two sets of contacts arranged in circular order in combination with a resistance and a circuit and electrical connections connecting the corresponding contacts with a line through the resistance at different points so that as the brush revolves over the contacts, the resistance would be gradually cut in for one set of contact points and gradually cut out for the other set of contact points. Between these two sets of contacts, there is arranged a full line contact connected directly with the line and on the opposite side of the circle there is provided a dead space so that during a portion of the revolution of the brush, the lights will be out of circuit.

The further broad and pioneer feature, is the provision of a plurality of such dead space and contacts in combination with a plurality of such brushes; the contacts of each circle being connected with a separate circuit of lamps, and said brushes being arranged to revolve and engage the contacts of its respective circle; and being set in angular relation to each other so that one or more of said brushes may be operated and one or more in operation at the same time, whereby provision is made for blending the colors gradually and for producing romantic effects, depending upon the colors of the lamps in the different circuits and the arrangement of the arms for the different circuits of contacts and dead spaces.

A further broad and pioneer feature is the combination with a system of dim colored lamps.

Another feature is that there is no limit to the amount of current, which can be handled by this type of dimmer. I have carried 57,000 watts on this dimmer, while the former dimmers, as I am advised, have been limited to 15,000 watts.

An object of the invention therefore, is to provide an electric light dimmer, capable of operation with high currents.

A further object is to make provision for remote control of the apparatus.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description and the appended claims.

The accompanying drawings illustrate the invention.

Figure 1 is a diagram of the dial switches and the wire for a system in which three lamp circuits are employed with automatic and controlled devices therefor.

Fig. 2 is a view partly in perspective and partly diagrammatic of a lighting system constructed in accordance with this invention. Parts are broken away to expose parts otherwise hidden.

Fig. 3 is a plan view of the dial switch showing the driving mechanism.

Fig. 4 is a section on the line x^4—x^4 of Fig. 3, showing the worm shafts and gears for speed reduction between the motor and the dial switch.

Fig. 5 is a section on the line x^5—x^5 of Fig. 3 showing three circuit dial switch apparatus.

Fig. 6 is a section on the line x^5—x^5 of Fig. 4 with the parts enlarged; also parts omitted and parts broken away.

Fig. 7 is a section on the line x^7—x^7 of Fig. 6, parts broken away.

Fig. 8 is a section on the line x^8—x^8 of Fig. 7 showing a detail of the collector ring and brush support.

Fig. 9 is a section on the line x^9—x^9 of Fig. 6 showing an enlarged detail of one of the contacts.

Fig. 10 is a section on the line x^{10}—x^{10} of Fig. 6 showing an enlarged detail of one end of a brush.

Fig. 11 is a section on the line x^{11}—x^{11} of Fig. 10.

Fig. 12 is an axial sectional elevation of the remote controlled switch for respective circuits.

Fig. 13 is a section on the line x^{13}—x^{13} of Fig. 12.

Fig. 14 is an axial sectional elevation of the remote switch for opening or controlling all the circuits together. The three point knife is shown.

Fig. 15 is a section on the line x^{15}—x^{15} of Fig. 14 showing the knife switches in plan elevation.

Fig. 16 is a section on the line x^{16}—x^{16} of Fig. 15, with the parts enlarged.

Fig. 17 is a section on the line x^{17}—x^{17} of Fig. 14 with parts broken away and parts omitted.

Fig. 18 is a detail of the three point knife switch for the manual control of the separate circuits.

In detail the apparatus 1 consists of the line wires 2 and 3; dial switches 4, 5 and 6; resistance coils 7, 8 and 9; lamps 10, 11 and 12; electro-magnetic switches 13, 14, and 15 adapted to automatically make and break electrical connection between said resistance and the lamp and its respectively automatic controlled knife switches 16, 17 and 18; manually controlled knife switches 19, 20 and 21 respectively, and also the wiring that properly connects the foregoing parts for operation, which wiring will be mentioned later.

The detailed construction and operation of the dial switches 4, 5 and 6 is shown in the drawings from Figs. 2 to 11 inclusive; and as seen therein, there is a frame 25 formed of the vertical angle irons 26 which are secured together by the top and bottom angle irons 27 and 28 respectively, forming thereby an open rectangular frame.

Also on opposite sides of the frame 25 and secured to the vertical angle irons 26 are the horizontal angle irons 29 that are positioned in pairs equidistant apart one above the other which pairs of angle irons form a support for the marble slabs 30, 31 and 32 respectively.

Also as best shown in Fig. 5, there is a cross plate 33 that is positioned central across the top of the frame 25 and has its ends secured to the angle irons 27; and also at the bottom of the frame 25 and positioned central therein is the cross plate 34 that has its ends secured to the angle irons 28, and mounted in the block 35 secured to the cross plate 34 is one end of the central vertical shaft 36 which shaft extends upward through the openings in the marble slabs heretofore mentioned and also through the cross plate 33, and has secured to the upper end thereof the bevel pinion 37.

Meshing with the pinion is a bevel gear 38 which gear is secured to one end of the shaft 39; one end of which shaft is rotatively mounted in the bearing 40, said bracket being secured to the cross plate 33.

The other end of the shaft 39 is mounted in the bearing stand 41; and secured to said shaft 39 and near to the stand 41, is the worm wheel 42.

The worm 43 meshes with the worm wheel 42 which is integral with the shaft 44; and the shaft 44 has its ends mounted in the bearing stands 45 and 46 respectively which stands are secured to the frame 25.

Secured to the shaft in position to mesh with a worm 47 on the shaft 48 is the worm wheel 49; and the shaft 48 has one end thereof supported by the bearing stand 50, which stand is secured to the frame 25; and the other end of the shaft 48 extends through and is driven by the motor 51; and the motor is supported by the cross plate 33. The motor 51 may be connected by the wires 51′ and 51″ to a source of electric power not shown.

By means of the motor 51 and its worm drive connection to the shaft 36 the latter is driven at low speed of about one revolution to every four minutes; which speed of course can be either increased or decreased by increasing or decreasing the ratio of the worm gears between the motor and the shaft.

It is thought, however, that the above speed will give the best results for an apparatus with a three dial switch; although good results can be obtained with other speeds.

Secured to each of the marble slabs 30, 31 and 32 are a plurality of contacts 52 consisting of square headed copper bolts extending downward through holes 53 in said marble slabs; the center of said holes being an equal radial distance from a central vertical line through the shaft 36; in other words the contacts 52 are located in the circumference of circles around said shaft.

The lower end of each copper bolt 52 is threaded and has on the threaded end thereof the nuts 54 between which nuts is secured one end of the line wire for each contact.

As seen in the drawings, there are in each of the dial switches two sets of contact

points comprising twenty pairs of resistance contacts, one segment of line contacts; and a dead space equal to the distance between thirty contacts which makes a total of seventy-five units of space in the dials to be traversed by the brushes at each revolution of the shaft 36. The sets of contacts are disposed on opposite sides of the segment of line contacts.

The contacts of the dial switches 4, 5 and 6 and also the segment of line contacts and dead spaces are substantially alike; and are secured to the marble slabs in the same way.

There are also brushes 55, 56 and 57 for each of the dial switches 4, 5 and 6, and these brushes each has its hub 58 secured to the shaft 36 by the set screw 59. These brushes are formed with the overlapping arms 60 and 61, the overlapping portion of said arms being insulated from one another by the insulation strip 62 and plugs 63, said plugs surrounding a portion of the bolts 64 by which bolts the arms and insulation material are held together.

The loose ends of the brushes 55, 56 and 57 each has a squared boss 65 thereon through which there is a square opening 66 and in this opening there is slidably mounted the squared contact 67. On the upper side of the contact 67 and centrally located thereon is the stem 68 which extends upward through an opening 69 in the raised finger 70; which finger has one end integral with the arm 61.

There is a spring 71 enclosing the stem 68 and said spring is interposed between the upper side of the contact 67 and the under side of the finger 70; and the function of this spring is to give a resilient movement to the contact 67 as it is moved over the surfaces of the contacts 52.

The upper end of the stem 68 is threaded and has thereon the nuts 72 and between the nuts 72 there is secured one end of the wire 73.

The other end of the wire 73 is secured between the nuts 74 on the threaded end of the post 75, one end of which is integral with the collector ring 76 mounted on the shaft 36 and insulated therefrom by the fiber bushing 77. The collector ring is secured on said bushing by the fiber ring 78; and both the bushing 77 and ring 78 are secured to the shaft 36 by the set screws 79.

The brushes 55, 56 and 57 and their connection from the contacts 67 to the collector rings 76 are substantially alike; but for the purpose of distinction in the wiring of the apparatus the wires connecting the contacts 67 to the collector rings 76 are numbered 73, 80 and 81 respectively.

The collector rings 76 have contacting with them the collector brushes 82 and these brushes are secured to the brackets 83 by the bolts 84 and as best shown in Fig. 8 the brushes are insulated from the brackets 83.

One of the brackets 83 is secured by bolts 85 to the underside of the plate 33; and the other two are secured to the underside of the marble slabs 31 and 32 respectively.

Secured to a bolt 84 of each of the brushes 82 is one end of the wires 86, 87 and 88; and the other ends of said wires lead to the contacts 89, 90 and 91 of the three pole knife switches 16, 17 and 18.

Preferably these automatic controlled knife switches 16, 17 and 18 are secured in the casing or box 92; and the detail of these switches and enclosure is shown in Figs. 14 to 17 inclusive.

The contacts 89, 90 and 91 are secured to the bottom of the box 92 by the screws 93 and insulated from said bottom by the insulation 94 best shown in Fig. 16. These contacts have upwardly extending flanges 95 in which one end of the knife 96, 97 and 98 are pivotally mounted.

The other ends of the knife switches 96, 97 and 98 pass between the spring forks 99 of the contacts 100, 101 and 102; and have their ends pivotally connected to the yoke 103 which yoke is preferably formed of insulating material, see Fig. 17.

The yoke 103 has an upward extension 103′ centrally located thereon that is pivotally connected by the links 104 to the core 105 by the pins 106 and 107; and the core 105 is operatively connected to a solenoid 108.

The solenoid 108 is secured to the bracket 109 by the bolts 110; and the bracket is secured to the rear wall of the box 92, and also the solenoid is insulated from the bracket. This solenoid is of usual construction and is operated in the usual way, except that it has connected to the core 105 one end of the rod 111. The other end of the rod 111 extends through the upper end of the solenoid and is pivotally connected to one end of a hand lever 112 by the links 113 and pins 114; also there is an insulation between the rod 111 and lever 112.

The lever 112 extends out of the box 92 through the slot 115 and is fulcrumed on the pin 116 on the lug 117; and has on its other end the handle 118 by which handle the lever can be moved to open or close the knife switches heretofore mentioned, and which are connected thereto.

Above the lever 112 there is pivotally mounted on the pin 119, which pin is secured in the lug 119′, one end of the dog 120; and the loose end of this dog is adapted to engage the teeth 121 on the upper edge of the lever 112 and hold it in the position shown by dotted lines in Fig. 14 when the handle of said lever is depressed to open the knife switches. Also this dog will engage the teeth 121 when the solenoid opens the switches and hold them open unless this dog

is turned upward to the dotted position shown in the above figure.

From the contacts 100, 101 and 102 there are wires 122, 123 and 124 that have one end secured to said contacts and which pass from the box 92 through the stud bolts 125 to one side of the lamps 10, 11 and 12.

The line wire 2 is connected directly to the segments of line contacts by the wires 126, 127 and 128; and to these lines are attached one end of the resistance 7, 8, and 9.

As seen in Fig. 1 the segments of line contacts *a* are joined to the line wire 2 by the wires 126, 127 and 128, and the contacts 52 on opposite sides of the segment of line contacts *a* are joined in pairs by the wires 129; and are connected to the resistance 7, 8 and 9 by the wires 130 at relatively increased resistant points in said coils, see Fig. 1.

Secured to the wires 122, 123 and 124 is one end of the wires 131, 132 and 133 which have their other ends secured to the contacts 134, 135, and 136 of the solenoid switches 13, 14 and 15. To the other contacts 137, 138 and 139 of these solenoid switches are secured one end of the wires 140, 141 and 142 which latter wires are joined at the point 143 and are connected by the wire 144 to the line wire 2.

Also from the line wire 2 there is a wire 145 from which branch wires 146, 147 and 148 lead to the contacts 149, 150 and 151 of the three point switches 19, 20 and 21.

From the intermediate contacts 152, 153 and 154 of these three point switches there are wires 155, 156 and 157 to the wire 158 which latter wire has its other end attached to one end of the coil of the solenoid 108; and to the other end of the coil of the solenoid 108 there is attached one end of the wire 159, which has its other end attached to the line wire 3.

Secured to the remote contacts 160, 161 and 162 of the three point switches 19, 20 and 21 is secured one end of the wires 163, 164 and 165; and the other ends of these wires are attached to coils 166, 167 and 168 of the solenoid switches 13, 14 and 15. The other ends of the coils 166, 167 and 168 are connected to the wire 159 by the wires 169, 170 and 171, and through the wire 159 connected to the line wire 3.

The solenoid switches 13, 14 and 15 are substantially alike and a description of one will describe all of them, consequently only a detailed description of the switch 13 is given.

As seen in Figs. 12 and 13 the solenoid switch 13, is enclosed in a casing 172; and the casing has in the bottom thereof, the posts 173 on which a marble plate 174 is secured. Between the top of the posts 173 and the marble plate 174, there is a fiber cushion 175, the purpose of which is to relieve the shock of the contact brush 176 engaging the contacts 134 and 137.

The brush 176 is preferably formed of laminated spring copper or brass strips that are secured between the plates 177; which plates have on their inner sides the flanges 178; and between these flanges and the bearing plate 179, the strips of the brush 176 are secured by the rivet 180.

The plates 177 are pivotally connected to the core or armature 181 and insulated therefrom by means of the pins 182 and 183 respectively, see Fig. 13.

To the upper end of the core 181 there is a rod 184 that extends up through the upper end of the solenoid 166; and the upper end of this rod is pivotally connected to one end of the lever 185 by the links 186; and suitable insulations are interposed between the connections of said rod to said lever.

The lever 185 is fulcrumed on the pin 188 which is secured in the hanger 189, which hanger extends downward from the top covering of the casing 172.

The other end of the lever 185 extends through the slot 190 to the outside of the casing 172, and has on the end thereof, the handle 191 by which the lever is manually operated.

Above the lever 185 there is pivotally mounted on the pin 192, one end of the dog 193, which dog has its other end positioned to engage the upper surface of the lever 185, and hold it in depressed position when said lever is moved manually to close and circuit between the contacts 134 and 137. Also the dog 193 will hold the lever in depressed position when moved by the solenoid 166 unless the dog is turned upward and backward to its upper dotted position shown in Fig. 12, in which position it is neutral. The pin 192 is secured in the lug 194 that is positioned on the casing directly above the slot 190.

Preferably the bottom part of the casing 172 and also the bottom of the casing 92 is preferably filled with oil up to the heavy dotted lines 195 so that the bottom position of the solenoids 108 and 166 will be covered as will also be the contacts thereon.

As seen in Figs. 12 and 14, the wires connected to these solenoid switches are passed through the walls thereof by means of the stud bolts 125, the construction of which are well known; consequently a detailed description of them is not given.

The three point knife switches 19, 20 and 21 shown diagrammatically in Fig. 1, and in side elevation in Fig. 18 are of common construction and well known, consequently a detailed description of them is not given.

As seen in Figs. 2 and 5 the frame of the dial switches is positioned in an open top tank 196, which tank is preferably filled

with oil up to the heavy dotted line 197 shown in Fig. 5, so that all the contacts will operate under the surface of the oil, the purpose of which is well known.

In operation, current is supplied through the wires 51′ and 51″ to the motor 51 from some source of supply not shown; and through motor 51 and its worm drive and gear connection to the pinion 37, the shaft 36 is revolved at the speed of about one revolution in four minutes; and in revolving the shaft 36, the brushes 55 of the dial switches are moved.

In a three dial switch apparatus, the brushes 55 are preferably positioned at equal distances around the circumference of said shaft, so that a line central through said brush will divide said shaft into thirds or equal parts. It is understood of course that with an apparatus using more or less of said dial switches that their positions on the shaft would be changed. In other words I do not desire to be limited to any specific positions the brushes may occupy, relative to one another, as positions other than equidistant ones may accomplish the same result.

With the shaft 36 revolving in the direction of the arrows on the dial switches 4, 5 and 6, shown in Fig. 1 and with the lamps 10, white, lamps 11, red, and the lamps 12, amber, these three colors will alternately be increased and decreased to their highest and lowest candle power; and at each revolution of the shaft 30, one of each of the circuit of lamps 10, 11 and 12 will be on open circuit; and consequently be dead or dark.

With the lamps of the colors above stated, and the brushes positioned as seen in Fig. 1, and moving in the direction of the arrows, the brush of the dial switch 4 will be closed on the contact *b* consequently the white lights will be burning at a voltage next to its highest brilliancy, at which time the brush is next to the segments of line contacts *a*.

The brush of the dial switch 5 is on the dead space *x*, consequently the red lights 11 are dead; and the brush of the dial switch 6 is on the contact next to its lowest voltage, consequently the amber colored lamps are burning at their lowest candle power which low voltage is on the contact *c*.

From the foregoing it can readily be seen that there is a blending of the white and amber lights, which blending will continually change as the brush of the dial switch 4 moves from the contact *b* toward the contact *c*; and as the brush of the dial switch 6 moves from the contact *c* toward the contact *b*, which movement of brushes will cut in resistance to the white lights and decrease their candle power and cut out resistance on the amber lights to increase their brilliancy.

After the brush of the dial switch 4 leaves the contact *c* and enters the dead space *x*, the brush of the dial switch 6 moves onto the segment of line contacts *a* at which line only the amber lights are burning, and at which line these lamps are at their highest brilliancy as they are then receiving their voltage directly from the line wire 2.

As soon, however, as this brush of the dial switch 6 begins to leave the contact *a* the brush of the dial switch 5 leaves the dead space *x* and engages the contact *c* causing the red lights to become active at their lowest candle power, which candle power of the red lights increases as the amber lights fade away.

As soon as the brush of the dial switch 5 has contacted with the segment of line contacts *a*, the amber lights are dead, owing to the brush of the dial switch 6 contacting with the dead space *x*; and then the red lights are receiving their highest voltage.

As the brush of the dial switch 5 leaves the segment of line contacts *a* the brush of the dial switch 4 passes from the dead space *x* to the contacts *c*, whereby there is a blending of the red and white lights, which blending will vary until the red lights fade away and the white lights reach their highest brilliancy by the brush of dial 4, engaging the segment of line contacts *a*.

This intermittent and varied blending of the colored lights will continue as long as the dial switches are moved by the rotation of the shaft 36, and the circuit between the dial switches 4, 5 and 6 is uninterrupted, and a means is provided for interrupting this circuit which means consists of the three point switches 19, 20 and 21, the purpose of which will now be explained.

Assuming that the apparatus is in operation and the dial switches moving to give the varied light effects just described, and that the operator desires to discontinue all but the white lights. By moving the three point knife switch 19 to a closed position a circuit is first formed between the contacts 146 and 152, whereby the coil of the solenoid 108 is energized to lift the coil or armature 105 and thereby opening the circuit to all of the dial switches, which of course breaks the circuits to all the lights.

Another circuit for the white lights is instantly formed by the closing of the three point switch 19, which connects the contact 160 with the contacts heretofore mentioned, which forms a circuit to the solenoid switch 13.

This circuit is from the line wire 2 through line 145 to the switch 19; and from the contact 160 of said switch through wire 163 to one end of the coil 166; and from the other end of the coil 166, the connection is over the lines 169, 159 to the wire 3, and this circuit actuates the solenoid switch to

close the circuit between the contacts 134 and 137 through which circuit the lamps 10 are lighted directly through the line wires 2 and 3; the current in this circuit passes over the wires 2, 144, and 140 to the contact 137; and through the brush 176 to contact 134 and from this contact through the wires 131 and 122 to the lamps and through the lamps to the line wire 3.

The circuits and the operation of the three point knife switches 20 and 21 are substantially like the circuits and operation of the three point knife switch 19, consequently for the sake of brevity, a detailed description of their circuit connections will not be repeated as these connections are given in the foregoing specification.

From the foregoing it can readily be seen that with any one of the three point knife switches closed the dial switches will be instantly opened and a constant light substituted for the variable lights.

Also it can readily be seen that two or more of the three point knife switches may be closed to give a constant light of blended color.

Also any of the switches may be operated to give a flash light such as is used in producing storm effects, and in this respect as well as in many other features, the invention is broadly new and basic in principle.

This invention admits of changes and modifications and a right is reserved to all such alterations and changes as do not depart from the scope and spirit of the invention.

I claim:

1. In a varied light apparatus, a dial switch; means for continuously revolving said switch in one direction; a lamp; an electrical connection between said dial switch and said lamp; a resistance interposed between said dial switch and said lamp whereby the candle power of said lamp will vary as said dial switch revolves.

2. In a varied light apparatus, a dial switch operatively connected to an electric circuit; means for continuously revolving said switch in one direction; electric lamps in said electric circuit; a resistance interposed between said dial switch and said electric lamps; contacts in said dial switch; and electrical connections between said contacts and said resistance, said connections to said resistance being at varied points therein whereby the candle power of said electric lamps will vary as said dial switch revolves.

3. In a varied light apparatus, a dial switch operatively connected to an electric circuit; means for continuously revolving said switch in one direction; electric lamps in said electric circuit; a resistance interposed between said dial switch and said electric lamps; a segment of line contacts in said dial switch; other contacts in said dial switch; and electrical connections between said contacts and said resistance, said connection to said resistance being at varied points therein whereby the candle power of said electric lamps will vary as dial switch is operated.

4. An electric dimmer comprising a brush revoluble around an axis and a segment of line contacts and a plurality of contact points arranged in circular order on opposite sides of said line contacts and in combination with a resistance and a circuit having electrical connections connecting the contacts on opposite sides of said segment of line contacts with a line through the resistance at different points so that as the brush revolves over the contacts the resistance will be gradually cut in when on one side of said segment of line contact points and gradually cut out when on the other side of said segment of line contact points; and means for continuously revolving said brush in one direction around an axis.

5. An electric dimmer comprising a brush revoluble around an axis and two sets of contact points arranged in circular order in combination with a resistance and a circuit having electrical connections connecting the corresponding contacts of said sets with a line through the resistance at different points so that as the brush revolves over the contacts the resistance will be gradually cut in at one set of contact points and gradually cut out for the other set of contact points, a full line contact connected directly with said first named line, and a dead space on the circuit so that during a portion of the revolution of the brush the lights will be out of circuit; and means for continuously revolving said brush in one direction around an axis.

6. A device of the character set forth provided with a plurality of dial switches each having a plurality of contact points and a dead space in circular order and in combination with a plurality of brushes revoluble around a common axis; the contacts at each circle being connected with a separate circuit of lamps and each of said brushes being arranged to revolve and to engage the contacts of its respective circle; said brushes being seated in annular relation to each other so that one or more of said brushes may be operated and one or more may be in operation at the same time; thereby blending the colors gradually for the purpose of producing a romantic effect; and means for continuously revolving said brushes in one direction around an axis.

7. The appliance of the character set forth comprising a frame; three insulation slabs in said frame arranged one above another; a shaft in said frame said shaft extending through and arranged central to

said slabs; a brush on said shaft for each slab; lamps in circuit with said brushes; contact points on said slabs that are adapted to be placed in circuit with said lamps by the actuation of said brushes; and means for actuating said shaft to move said brushes continuously around the axis of said shaft.

8. The variable light apparatus set forth comprising an electric lighting system; lamps of different color in said lighting system that are arranged in circuit; a dial switch for each circuit of colored lamps, said switches adapted to revolve around a common axis; means to continuously revolve said switches in one direction around an axis; and means for blending the lights of said colored lamps as said switches revolve.

9. The varied light apparatus set forth comprising an electric light system; circuits of lamps of different color in said electric light system; dial switches for each circuit of colored lamps; means for rotating said dial switches continuously to alternate and blend the lights of said circuits of lamps of different color; and manual means for opening the circuit to all of said dial switches and that will automatically close a circuit to any one of said circuits of lamps of different color.

10. The varied light apparatus set forth comprising a light system; circuits of lamps of different color in said light system; means whereby varied lighting effects can be produced continuously in regular course with said circuits of lamps of different color; and a switch for manually interrupting all of said varied light effects by cutting out all circuits of lamps and then automatically raising a selected circuit of lamps to its greatest brilliancy.

11. The variable light apparatus comprising a frame; a plurality of dial switches in said frame, said switches arranged one above another brush for each dial switch; a shaft to which said brushes are attached; means for continuously rotating said shaft to move the brushes attached thereto; contacts positioned to engage the brushes on said shaft; lamps in circuit with said contacts; and a variable resistance interposed between said lamps and said contacts whereby the candle power of said lamps will vary as the shaft revolves.

12. The variable light apparatus comprising a frame a plurality of dial switches in said frame that are arranged one above the other; a shaft centrally located in said dial switches; a brush for each dial switch that is secured to said shaft; contacts in said dial switches that are an equal radial distance from the center of said shaft; lamps in circuit with said contacts; a variable resistance interposed between said lamps and said contacts; and means for revolving said shaft continuously in one direction to move the brush of each dial switch to consecutively engage the contacts of each dial switch and thereby produce a varied light effect.

13. The variable light apparatus comprising a frame, a plurality of dial switches in said frame; a shaft; brushes for said dial switches secured to said shaft; means for revolving said shaft continuously in one direction; contacts in said dial switches that are positioned to engage the brushes on said shaft; lamps of different color in circuit with said contacts; a variable resistance interposed between said lamps and said contacts whereby the candle power of said lamps will vary as said shaft is revolved to move the brushes thereon; means whereby the other of said lamps will have their lights blended; and means for manually cutting all but one lamp out of circuit.

14. The variable light apparatus set forth comprising a frame, a plurality of dial switches in said frame; a shaft; brushes for said dial switches secured to said shaft; an enclosure for said frame, said enclosure adapted to contain fluid for submerging said switches; means for revolving said shaft; contacts in said dial switches that are positioned to engage the brushes in said shaft; lamps of different color in circuit with said contacts; a variable resistance interposed between said lamps and said contacts; a dead space in each of said dial switches; means whereby the brushes on said shaft are alternately contacting with said dead space; and means for varying the candle power of said lamps and blending said lamps when the brushes on said shaft are not contacting with said dead spaces.

15. The variable light apparatus comprising a frame, a plurality of dial switches each of said switches being provided with a revolving brush, and two circularly arranged contacts constituting two sets separated on one side of a dead space, said two sets of contacts being made up of pairs of contacts, the contacts of the pairs respectively being connected with the line through a definite resistance, such resistance for the successive pairs being successively increased, so that as the revolving contact sweeps around the circle it will successively at first, cut in the greater resistance and then the succeeding lesser resistance, until one set has been passed and the line put in a successively increasing resistance as the other set is passed; and means for submerging said switches and the brushes thereof in oil.

16. The variable light apparatus set forth comprising a frame; a dial switch having two sets of contacts therein mounted in said frame; a line contact between the two sets of contacts of said dial switch; a brush revolving continuously in one direction adapt-

ed to consecutively engage said contacts; lamps in circuit with said contacts; a variable resistance interposed between said lamps and said contacts; and means whereby the candle power of said lamp decreases as the brush moves away from the line contact and increases as it travels toward the line contact.

17. The variable light apparatus set forth comprising a frame; a dial switch; a brush for said dial switch that is adapted to revolve entirely around an axis; two sets of contacts in said dial switch; means for connecting said contacts in pairs; a variable resistance and a connection between said pairs of contacts and the variable resistance; lamps in circuit with said pairs of contacts and said variable resistance; means for closing the circuit to said lamps and vary the candle power thereof; and means for continuously revolving said brush in one direction around an axis.

18. The variable light apparatus set forth comprising a frame; a dial switch; a line contact in said dial switch that is a segment of a circle; contacts on each side of said line contact, that are in arc alinement with the line contacts; and means for connecting the contacts on opposite sides of the line contact in pairs; a dead space in arc alinement with said contacts, said contacts and the dead space forming a circle; lamps in circuit with said contacts and a variable resistance between said lamps and said contacts; and means for closing the circuit to said lamps and varying their candle power, said means including an oil submerged brush that is adapted to move continuously in one direction around an axis.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 22nd day of April 1919.

GEORGE L. BLACK.

Witness:
WM. M. GENTLE.