A. C. McWILLIAMS.

CUT-OUT PULLEY.

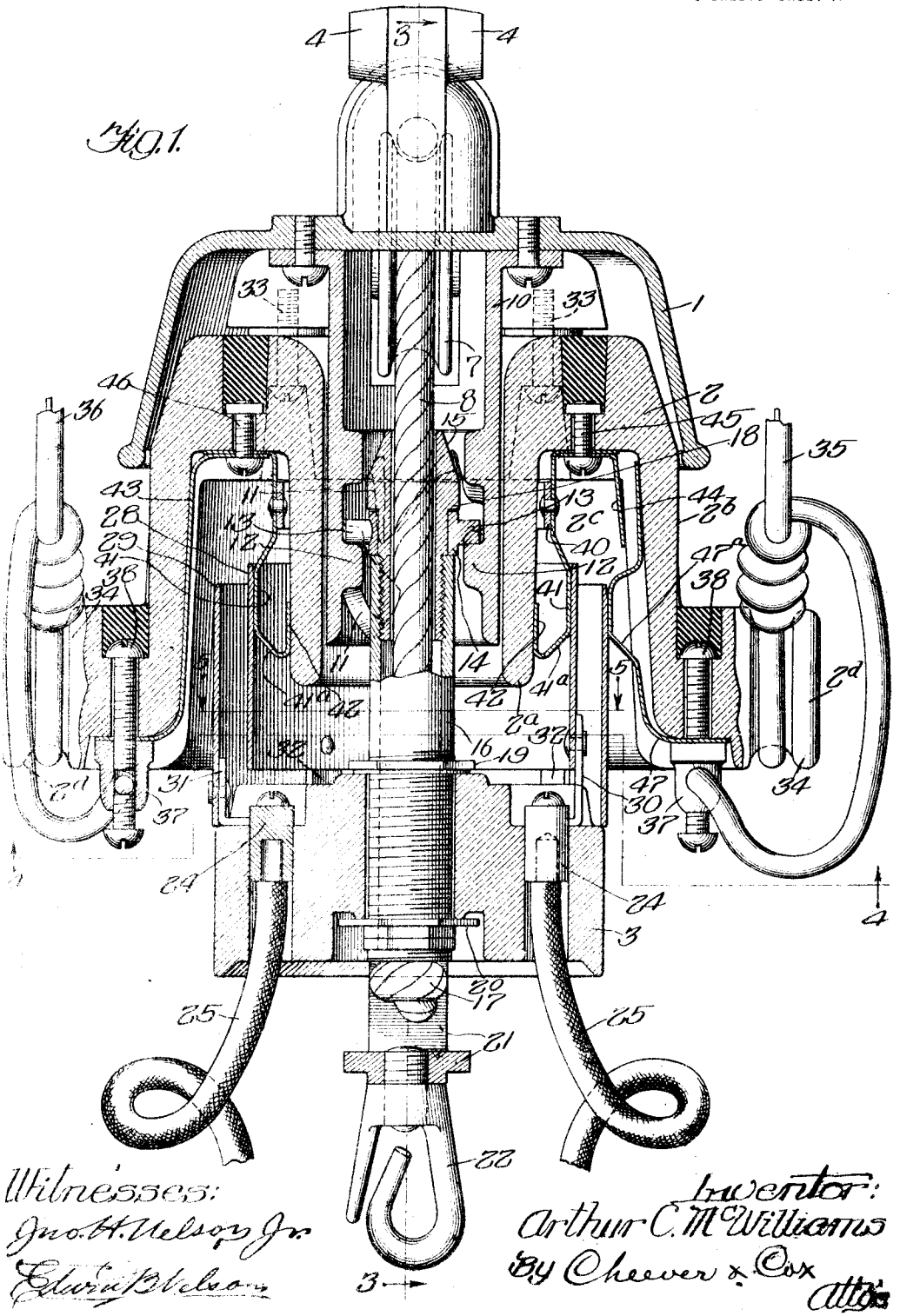
APPLICATION FILED MAY 21, 1914.

1,157,239.

Patented Oct. 19, 1915.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

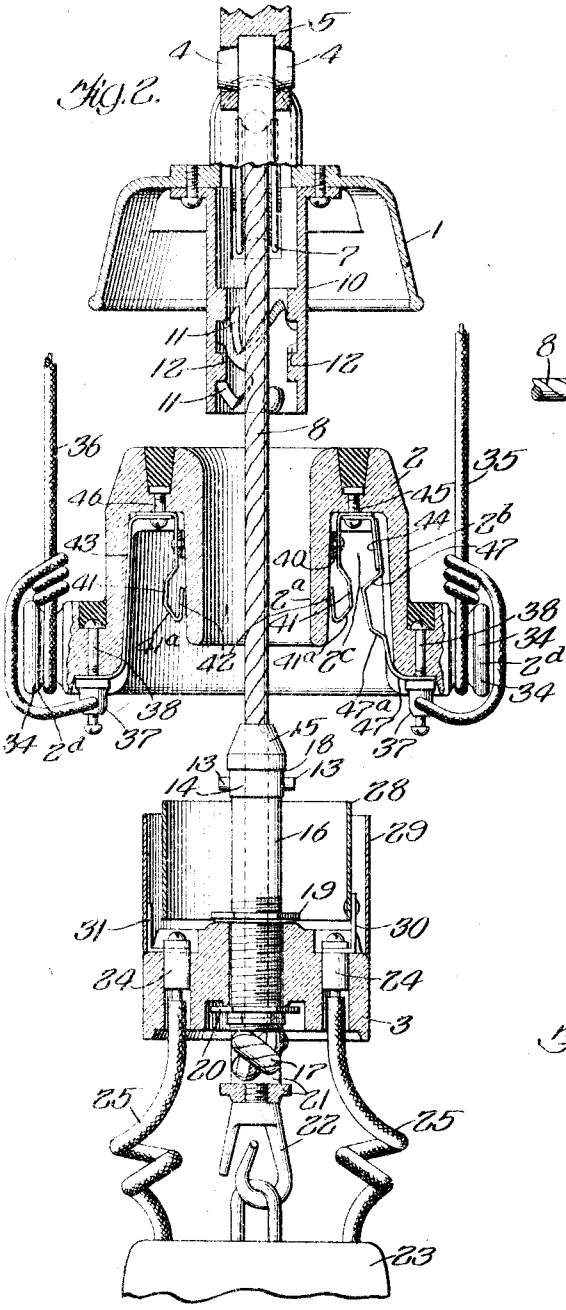


Fig. 3.

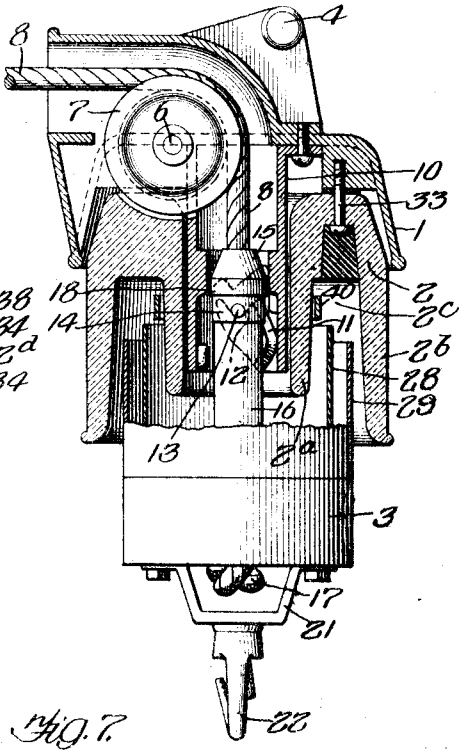
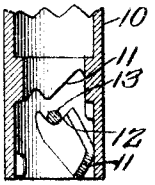


Fig. 7.



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3 SHEETS—SHEET 3.

Fig. 4.

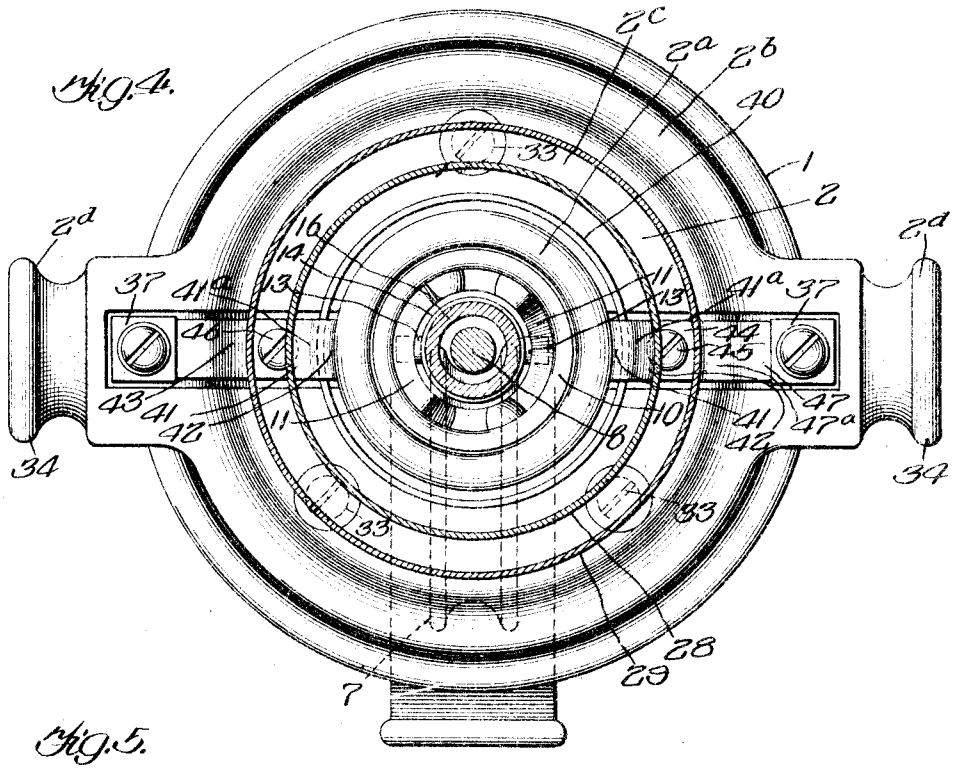


Fig. 5.

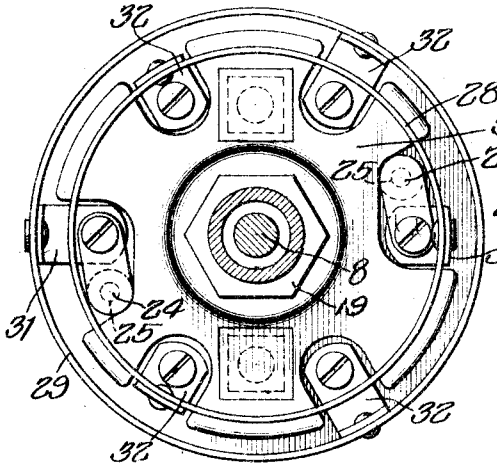
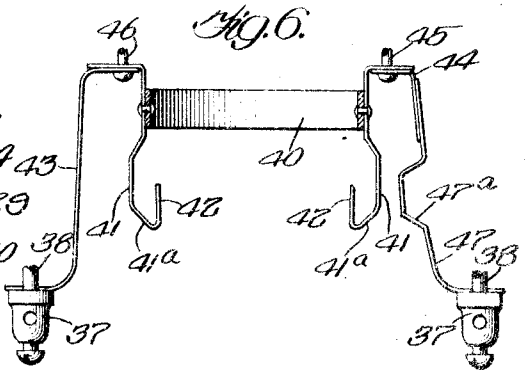


Fig. 6.



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UNITED STATES PATENT OFFICE.

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CUT-OUT PULLEY.

1,157,239. Specification of Letters Patent. Patented Oct. 19, 1915.

Application filed May 21, 1914. Serial No. 839,962.

To all whom it may concern:

Be it known that I, ARTHUR C. McWILLIAMS, a citizen of the United States, residing at South Bend, in the county of St. Joseph and State of Indiana, have invented a certain new and useful Improvement in Cut-Out Pulleys, of which the following is a specification.

My invention relates to supporting mechanisms usually known commercially as "cut-out pulleys" for electric lighting, and the general object of the invention is to provide a mechanically and electrically simple and durable construction and one which will afford high insulation resistance between the live parts and ground and between each other.

Among other specific objects of my invention, are, first, to produce a device which may be used for either multiple or series work by making a simple substitution of a single part; second, to provide a construction such that the surfaces where contact is made and broken in the raising and lowering of the lamp shall be kept always clean and bright, thereby assuring good electrical connection; third, to provide simple and efficient centering or positioning means whereby the vertically movable parts may come into proper register with the stationary parts during the act of raising the vertically movable parts—and this in spite of the thrust of a spring switch hereinafter described; fourth, to furnish the conductive elements with efficient protection from the weather and to provide details of construction hereinafter more fully described and claimed.

I accomplish my objects by the mechanism illustrated in the accompanying drawings in which—

Figure 1 is a vertical central sectional view showing my complete device in closed or normal operating condition. Fig. 2 is similar to Fig. 1 but shows the main parts separated. Fig. 3 is an assembly view in vertical section taken on the line 3—3, Fig. 1. Fig. 4 is a plan section taken on the line 4—4, Fig. 1. Fig. 5 is a plan view of the lamp holder and contacting rings and Fig. 6 is a detail of the electric connections located within the main insulator body. Fig. 7 is a fragmentary detail of the tubular extension of the canopy illustrating the internal cams thereof which rotate and support the collar upon which the vertically movable parts of the device are suspended during normal operating conditions.

Similar numerals refer to similar parts throughout the several views.

In the form selected to illustrate the invention, the device is separable into three principal portions or groups of parts shown separately in Fig. 2, to-wit: the canopy 1, the main insulator body 2, which is normally fastened to the canopy, and the lamp block 3.

The canopy 1 is preferably of cast iron and is provided with trunnions 4 by which it may be suspended from any suitable lamp bracket, mast arm, or stationary cross-wire, as indicated at 5, Fig. 2. Said canopy carries a pin 6 which serves as an axle for the pulley 7. The hoisting rope 8 passes over said pulley in the known manner and affords means whereby the lamp and its supporting block may be raised and lowered.

It is desirable that under ordinary conditions of use the weight of the lamp and its supporting parts be carried not upon rope 8, but be carried upon a stationary part such as the canopy. But as these parts are ordinarily high in the air out of reach of the lamp trimmer, it is desirable to provide an automatic connector whereby the vertically movable parts may be hung upon or released from the stationary part by merely manipulating the hoisting rope. This connector will now be described.

Fastened to the under side of the canopy, concentric with the rope, is a tubular extension 10 having internal cams 11, 12 constructed to cooperate with pins 13 which project horizontally from the rotatable collar 14. As best shown in Figs. 1, 2 and 7, the cams 12 are recessed to retain and support the pins 13, while the cams 11 are arranged above and below them and configurated in such manner that the cams beneath will rotate the pins to a position in line with cams 12 while the cams above will rotate said pins to a position out of line with cams 12. Said collar fits loosely over the head 15 which is rigidly fastened to the tube 16 by screw threads or otherwise. In the preferred design, the head 15 is in the form of a bushing and permits the lamp cord to pass down through it and through the tube 16 at the lower end whereof the rope may be secured by forming a knot 17 or by any

other suitable method. Collar 14 is confined vertically, in this preferred construction, between the upper end of tube 16 and the shoulder 18 formed on head 15 above the collar. By preference, the upper end of the head is tapered to enable it to more readily enter the lower end of the extension 10. The cams, collar and coöperating parts are so constructed that when the lamp is being raised the head 15 will enter extension 10 and the lower cams 11 will engage pins 13 and rotate them to such position that when they have risen slightly above cams 12 and are thereafter lowered, they will seat upon said cams and thereafter cause the strain due to the weight of the lamp and lamp support, to be carried by extension 10 and the parts to which it is fastened. When the operator wishes to release the connector preparatory to lowering the lamp, he first exerts a pull upon the rope sufficient to raise the pins 13 off their seats and into engagement with the upper cams 11 which will automatically rotate said pins to such position that when subsequently lowered they will clear the cams 12 and pass by them on their way out through the lower end of the extension.

From the foregoing, it will be apparent that the connector is automatic both in its locking and releasing and is of simple construction.

Tube 16 above mentioned carries the lamp and the vertically movable elements which rise and descend therewith and carry the switch operating devices. This portion of the structure will now be described.

Block 3 which is preferably of porcelain, is centrally apertured to receive tube 16 and is fastened to said tube in the present design by nuts 19 and 20 which screw onto the externally threaded lower portion of tube 16, and respectively overlie and underlie said block to hold it in position. A yoke 21 is bolted to the bottom of block 3, as shown for example in Fig. 3, and supports a hook 22 from which the lamp 23 (see lower end of Fig. 2) is suspended. Block 3 contains two metallic lugs 24 constituting terminals to which the lamp wires 25 are connected. It will be noted that said lugs are almost completely housed within block 3, and that the points of connection of said lugs to the lamp wires 25 are completely housed, and hence under conditions of normal use, these parts are completely protected against the action of the weather. At the top, block 3 is furnished with two concentric contact rings 28 and 29, the inner ring 28 being electrically connected by the metallic clip or foot 30 which in turn is electrically connected to one of the lamp wire terminals 24. The outer ring is similarly connected by a clip or foot 31 to the other lamp wire terminal 24. In order to hold the rings firmly upon block 3, there are supplemental fastening means in the form of feet or clips 32 as best shown in Fig. 5.

I will now describe the means whereby the contact rings 28 and 29 are rendered electrically alive when the lamp is in raised position and a short circuit provided for the current when the lamp is in lowered position:

The main insulator body 2, previously mentioned, has an inner cylindrical portion 2^a and an outer cylindrical portion 2^b, joined together at the top and thus affording an annular covered recess 2^c. The external diameter of insulator 2 is small enough to permit it to enter part way into the canopy 1, where it is permanently fastened by means of screws 33 (see for example the right side of Fig. 3 and upper portion of Fig. 1). The inner cylindrical portion 2^a of the insulator is centrally recessed to accommodate and house the extension 10. Two knobs 34 project from the side of the body 2 and are preferably integral therewith. They afford means of attachment for the line wires 35, 36. When assembled, said line wires are connected at their ends to binding posts 37 fastened to the bottom of insulator 2 by screws 38 or other suitable means.

Surrounding the inner tubular portion 2^a of the main insulator body 2 is a metallic ring 40 shown separately in Fig. 6. Rigidly fastened to this ring at diametrically opposite points are two spring fingers 41 arranged vertically and having their lower ends upturned to form lips 42. At the upper end one of these fingers is electrically connected to a metallic strip 43 which leads to and is electrically connected with one of the binding posts or line terminals 37. The other finger 41 is connected at the upper end to a switch clip or contact 44. This clip is removable, being fastened preferably by the bolt 45. This bolt and a similar one 46 serve to hold the fingers in electric contact with their coöperating elements and also serves as a fastening means for holding the parts to the main insulator body 2, as clearly shown in Fig. 1 and elsewhere. A spring switch 47 connects the clip 44 to the remaining binding post 37. The resilience of switch 47 constantly urges it toward the center of the device and toward the clip 44, with the result that when not forcibly held in retracted or repressed position said switch makes electric connection with the clip 44. The advantage in making the clip 44 removable is, that by removing it entirely or substituting a similar one made of non-conducting material, the short circuit from one line terminal to the other will be interrupted at this point when the rings 28, 29 are lowered. The device will then be suitable for "multiple" lighting instead of

"series" lighting as it is when a metallic clip 44 is present.

The parts are so formed that when the lamp is in raised position, as shown in Fig. 1, the contact ring 28 will engage the spring fingers 41 and make electric connection therewith. At the same time the lips 42 on said fingers will abut the external surface of the tubular portion 2^a. A taper 41^a is formed the lower end of each of the fingers 41, and these aid the ring 28 in finding the proper concentric position during the act of raising the lamp. Furthermore, as these fingers are symmetrically placed on opposite sides of the tubular portion 2^a and bear against it, they serve to hold ring 28 concentric in spite of the lateral thrust of the spring switch 47 which bears against the external ring 29 when the lamp is raised and exerts a force which would otherwise throw the rings out of concentric position. The spring fingers 41 with their lips 42 bearing against the insulator body, therefore, serve not only as electric contactors but also as centering means for the contact rings 28 and 29 and parts fastened thereto. It is desirable to form a taper shoulder 47^a upon switch 47 to permit the ring 29 to force the switch 47 back gradually out of contact with the clip 44 when the lamp is being raised. The proportions are such that the inner ring 28 will engage the fingers 41 and thus furnish an electrical path through the lamp, before the external ring 29 engages the switch 47 and opens the circuit between said switch and the clip 44. This arrangement renders it certain that the main wire 35 will at all times be in electric connection with the main wire 36 either through the lamp or through a shunt path carried by the stationary part of the device so long as clip 44 is present and constructed of conductive material.

The operation of the apparatus as a whole will be evident from the foregoing detailed description.

The line circuit is undisturbed by the lowering of the lamp. The switching devices are automatic in their operation and it is obvious that they are completely housed in the main insulator and hence are at all times protected from the weather. In this, the preferred form, said main insulator is of one piece and is itself in the form of a canopy capable of shedding water from practically all parts of the apparatus within and beneath it. Said insulator is itself housed under the canopy 1 and thus additional protection to the parts is afforded. Again, as a result of the canopy-like configuration of the main insulator, the metallic parts are effectually insulated from each other and from ground, and as this configuration lends itself to making the main insulator of large proportions, the device has the additional advantage of being exceptionally durable.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a device of the class described, the combination with a hoisting rope, of an insulator hollowed out on the under side to form a canopy, said insulator having a central opening and being provided with two line terminals, a metallic canopy surmounting said insulator, said metallic canopy having an opening for the hoisting rope, an insulating block attached to the lower end of said rope, a pair of terminals mounted on said block, a contact ring mounted on said block and connected to one of the said terminals thereon, a spring switch connected to one of the line terminals and located chiefly within the insulator, a metallic element also located chiefly within the insulator and connected to the remaining line terminal thereon, the resilience of said spring switch tending to cause it to engage said metallic element to close the line circuit therethrough, said spring switch being in position to be engaged by said contact ring when the latter is raised and to be forced by it to open position, away from said metallic element, and means for positioning said contact ring and enabling it to overcome the thrust of said spring switch, said positioning means including a conductor for closing the circuit from said conductive element to the remaining terminal on said block.

2. In a device of the class described, the combination of a stationary insulator deeply chambered on the under side and provided with two line terminals, a vertically movable insulating block provided with two lamp terminals, two concentric rings mounted on said block and connected individually to the terminals thereon, said rings when raised being adapted to enter the chamber in said insulator, a spring switch connected to one of the line terminals, resilient fingers mounted in said insulator within the chamber thereof, said fingers being in position to engage one of said contact rings when the latter are raised to thereby guide the other of said rings against said spring switch to move the latter to open position, one of said fingers being connected to the remaining line terminal on the insulator, and a contact within the chamber in the insulator electrically connected to one of said line terminals and located in a position to be engaged by said spring switch when the latter is released.

3. In a device of the class described, the combination of a one-piece insulator having a recess in the bottom and provided with a line terminal, a vertically movable insulator block provided with lamp terminals, two upright contact rings mounted on said

block and adapted to enter said recess, said rings being individually connected to said lamp terminals, a spring switch on said insulator connected to one of the line terminals and adapted to be opened by one of said rings when the latter are in raised position, means for positioning said rings to thereby overcome the thrust of the switch, said positioning means being adapted to convey current from one of said contact rings to the remaining lamp terminals, and a contact mounted on said insulator and electrically connected to the last mentioned line terminal, said contact being in position to be engaged by said spring switch when the latter is released and being removable whereby, by the removal of said contact or the substitution thereof by an insulating element, the device may be converted from a "series" device to a "multiple" one.

4. In a supporting mechanism for electric lamps, the combination of a stationary insulator provided with line terminals, a vertically movable insulating block for supporting the lamp, contacts on said block for conveying current to and from the lamp, a spring switch connected to one of said line terminals on the insulator, said switch being in position to be repressed by one of the contacts on the vertically movable block, means for conveying current from the other contact on the vertically movable block to the remaining line terminal on the insulator, and a clip on said insulator electrically connected to the last mentioned line terminal and being located in position to be engaged by said switch when the latter is released, said clip being removable, for the purpose described.

5. In a cut-out pulley for electric lamps, the combination, with a hoisting rope and pulley, of a canopy whereon said pulley is mounted, a tubular extension depending from said canopy and provided with internal cams, a vertically movable element provided with contacts for the lamp, said vertically movable element being provided with a collar rotatable thereon about the vertical axis thereof, said collar being non-movable relatively to said vertically movable element, said collar having lateral projections small enough to enter into said tubular extensions on the canopy and cooperate with the cams therein, an insulator secured to the canopy and provided with line terminals, and connections upon said insulator for connecting the line terminals thereon with the respective vertically movable contacts, said connections including a spring switch repressible by one of said vertically movable contacts and a removable clip located in position to be engaged by said switch when the latter is released.

6. In a cut-out pulley, for electric lamps, the combination, with a hoisting rope and pulley, of a canopy whereon said pulley is mounted, a tubular extension depending from said canopy and provided with internal cams, a vertically movable element provided with contacts for the lamps, said vertically movable element being provided with a collar rotatable thereon about the vertical axis thereof, said collar being non-movable relatively to said vertically movable element, said collar having lateral projections small enough to enter into said tubular extension on the canopy and coöperate with the cams therein, an insulator secured to the canopy and provided with line terminals, and connections upon said insulator for connecting the line terminals thereon with the respective vertically movable contacts, said connections including a spring switch repressible by one of said vertically movable contacts and a removable clip located in position to be engaged by said switch when the latter is released, said insulator being composed of a single piece and being deeply chambered on the under side and the connections aforesaid being located practically entirely within said chamber.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

ARTHUR C. McWILLIAMS.

Witnesses:
HOWARD M. COX,
KATHRYN S. READY.