

(No Model.)

3 Sheets—Sheet 1.

E. F. G. H. FAURE, J. MACHAFFIE & S. H. LIBBY.

CONTROLLER FOR ELECTRIC SEARCH LIGHTS.

No. 539,863.

Patented May 28, 1895.

FIG. 1.

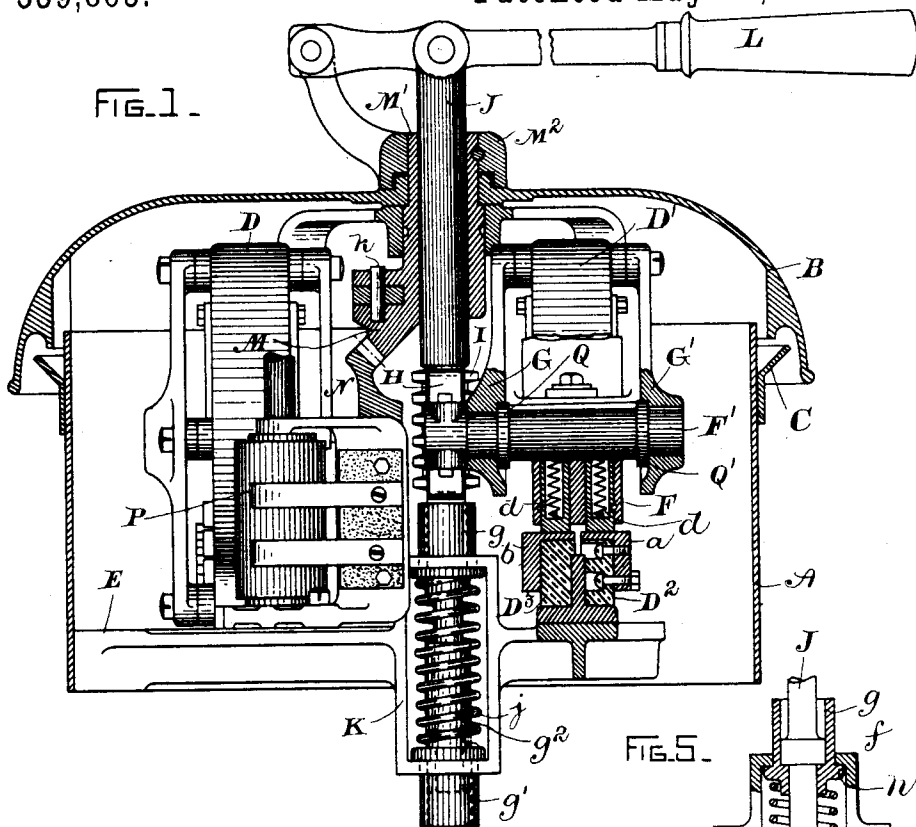


FIG. 5.

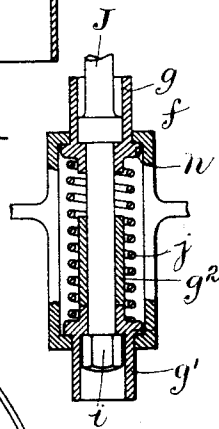
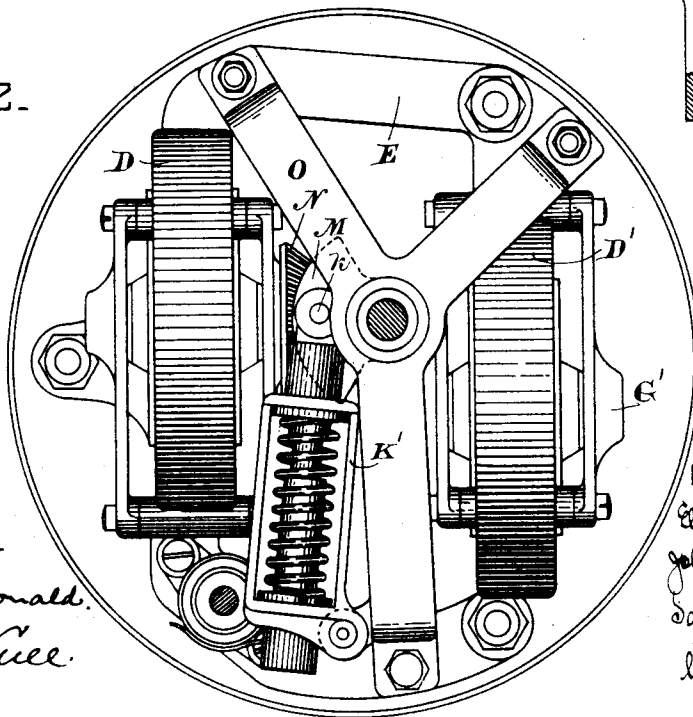


FIG. 2.



WITNESSES.

A. F. Macdonald.

B. B. Kice.

INVENTORS.

E. F. G. H. Faure,
John Machaffie &
Sam. H. Libby, by
Geo. R. Woodgett,
Att'y.

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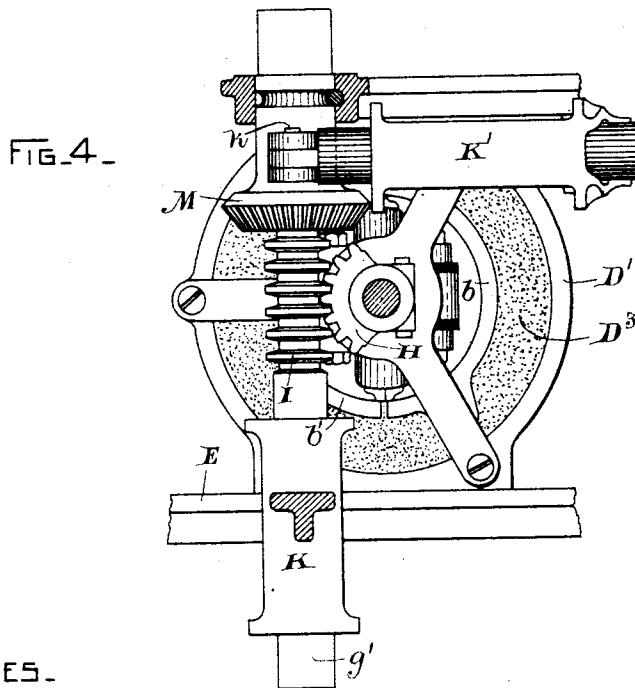
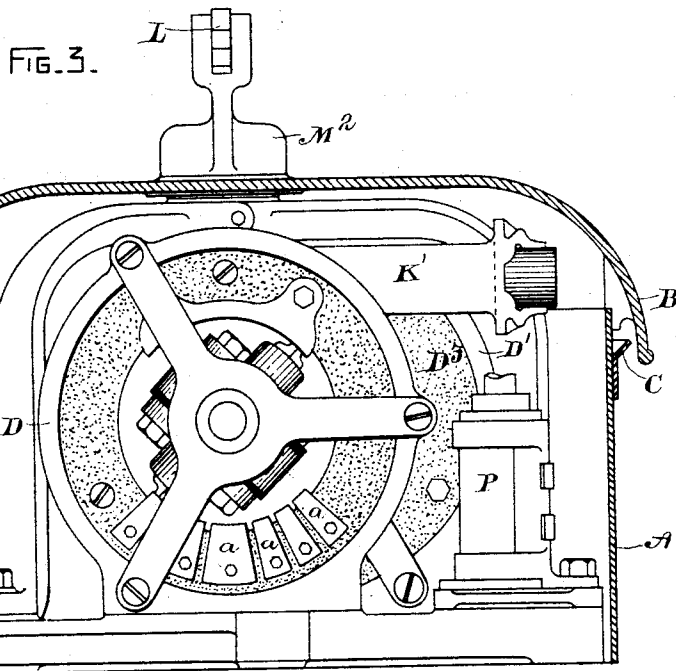
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WITNESSES.

A. F. Macdonald.

R. B. Hull.

INVENTORS.

E. F. G. H. Faure,
John Machaffie and
Sam'l. Libby, by
Geo. R. Blodgett,
Att'y.

(No Model.)

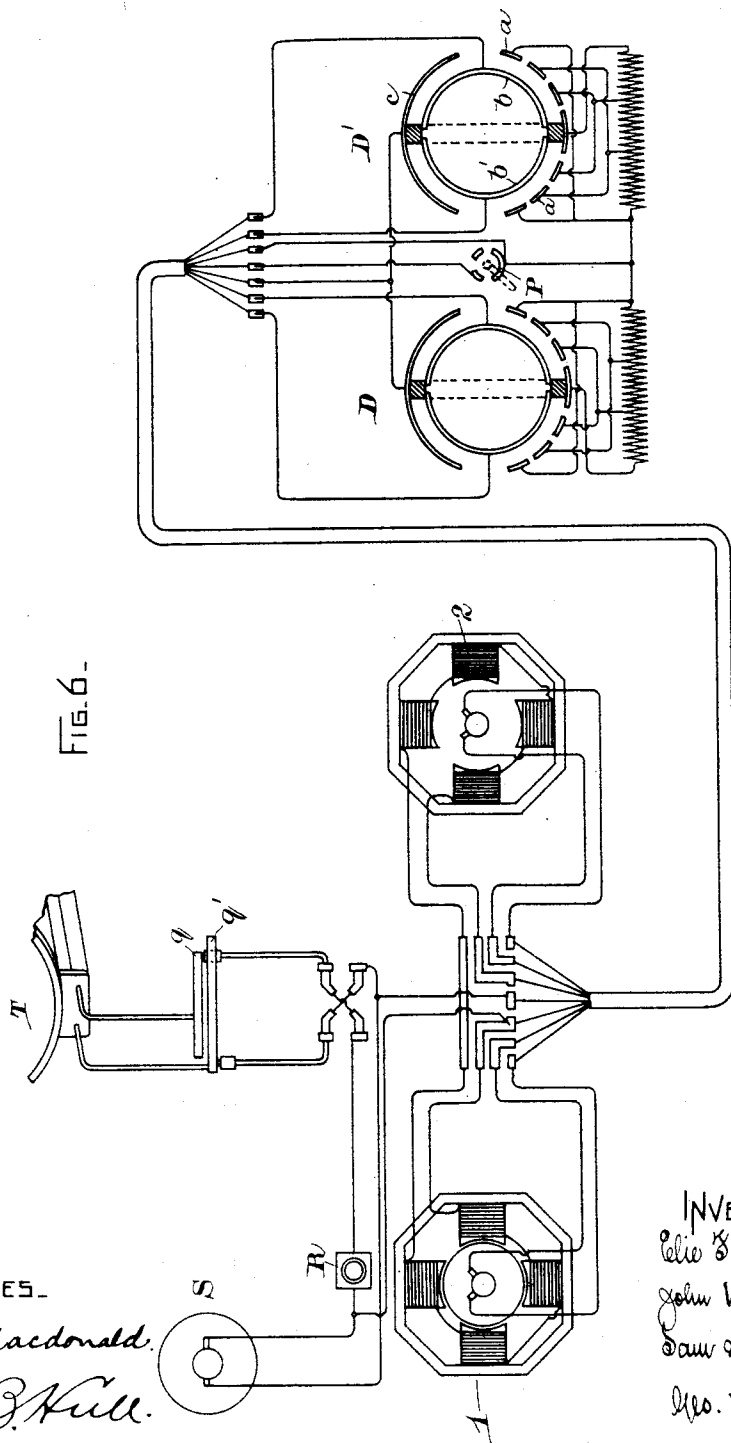
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WITNESSES.

A. T. Macdonald.

B. B. Kull.

INVENTORS -
E. F. G. H. Faure,
John MacHaffie, and
Sam. H. Libby, by
Geo. R. Blodgett,
Att'y.

UNITED STATES PATENT OFFICE.

ELIE F. G. H. FAURE, JOHN MACHAFFIE, AND SAM H. LIBBY, OF SCHENECTADY, NEW YORK, ASSIGNORS TO THE GENERAL ELECTRIC COMPANY, OF SAME PLACE.

CONTROLLER FOR ELECTRIC SEARCH-LIGHTS.

SPECIFICATION forming part of Letters Patent No. 539,863, dated May 28, 1895.

Application filed January 29, 1895. Serial No. 536,617. (No model.)

To all whom it may concern:

Be it known that we, ELIE F. G. H. FAURE, a citizen of the Republic of France, JOHN MACHAFFIE, a subject of the Queen of Great Britain, and SAM H. LIBBY, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Controllers for Electric Search-Lights, of which the following is a specification.

The objects of our invention are, first, to provide a controlling stand having one handle for operating both the horizontal and vertical movements of a search light, operating either separately or simultaneously, (in the latter case a motion in a diagonal direction would be imparted thereto;) second, to provide means for stopping the movement of the search light instantly and automatically; third, to so construct the parts that the direction of movement of the handle will indicate the direction which the beam of light will travel.

Briefly, the method of operation of our apparatus is as follows: Two motors are mounted in the base of a search light, and provided with suitable belts or gears connecting them with the horizontal and vertical moving parts of the search light. The controlling stand for these motors may be located at any convenient point where the operator may have an unobstructed view. The motor fields are connected in shunt to the main dynamo, and the current through the armature is varied by suitable resistance.

In operating search lights it is desirable to be able to bring them to a stop instantly, as a very small angular movement at the light will make an immense amount of movement of the beam several miles distance. To accomplish this, we cut resistance into the armature circuit and then short-circuit it, which brings it to a stop instantly. We do not, however, claim this method of control.

Our invention relates to certain mechanical features to be more fully explained hereinafter.

Although the invention is described in connection with a search light, we do not limit ourselves to this, for it is equally applicable

to the control of motors when used in connection with other apparatus.

To attain the ends pointed out, we mount two ring-shaped castings having insulated resistance contacts thereon, on a suitable base. These contacts have brushes engaging therewith, which are mounted on suitable spindles operated by means of a circular rack and pinion in one case, and by beveled gears in the other. Springs are provided in both cases to bring the brushes back to the off position the moment the pressure is removed from the operating handle. The operating spindle is composed in part of a circular rack with which the pinion operating one set of brushes engages. Around the upper part of the spindle is a bevel-gear provided with a sleeve extending upward through the cover of the box. Engaging with this bevel-gear is a similar one mounted on a shaft at right angles thereto operating a second set of brushes. A collar is secured to the sleeve surrounding the spindle, and from this projects a lug which forms a bearing for the end of the operating handle.

In the accompanying drawings, Figure 1 is a side elevation partly in section. Fig. 2 is a plan view with the cover removed. Fig. 3 is an end view looking from the left. Fig. 4 is a detail showing certain parts broken away. Fig. 5 is a detail view, and Fig. 6 is a diagram of connections.

A is the inclosing case.

B is the cover, and C is a flange preventing the splashing of water into the inclosing case.

The cast iron rings D, D' are mounted on a suitable base E, and are provided with contacts which are suitably insulated from each other and from the rings D, D' by insulating rings D² D³. The brushes engaging with these contacts are made of two metal pieces, enabling them to make good contact when the contacts *a* become worn. These are carried by a holder F, mounted on a shaft F' and tending to be forced outwardly by means of springs *d, d*. The shaft F' is mounted with bearings G G' which are supported by the ring D'.

To prevent lateral displacement of the shaft F', collars Q Q' are made thereon which engage with the bearings G G'. On the end of

the shaft F' is mounted a segmental gear H engaging with the circular rack I on the spindle J.

Referring now to Fig. 5, the spindle J has
 5 a collar *f* surrounding which is a sleeve *g* having an external flange *h* engaging with the inner surface of the cage K. On the lower end of the spindle J is a similar construction, except that a nut *i* takes the place of the collar
 10 F. A spring *j* tends to keep the flanges *h* *h'* in engagement with the ends of the cage K. To regulate the amount of movement of either *g* or *g'*, a sleeve *g²* is mounted on the spindle J and between *g* and *g'*.
 15 When, for example, the handle L is thrown down, it forces the spindle J downward and compresses the spring *j* until the sleeve *h* engages with the sleeve *g²*. On relieving the pressure on the handle L, it immediately flies
 20 back to its normal position, and the arrangement of the parts is such, that when the flange *h* engages with the top of the cage K, the spindle will stop, for any continued movement would serve to compress the spring from the
 25 opposite end. The converse of this is also true, if the handle L be thrown up instead of down, the one spring serving in both cases. The length of *g²* is determined by the amount of movement required for the spindle J. In
 30 this case it is such as to allow the brushes carried by the shaft F' to engage with the extreme right and left contacts on the rings D² and D³. The bevel-gear M, having a sleeve M', is loosely mounted on the spindle J. A bearing
 35 for said sleeve is formed by the Y-shaped frame O, which extends down to the base E. Above the cover of the box is a collar M² rigidly attached to the sleeve M' and having a projection extending therefrom forming a bearing
 40 for the end of the handle L. The gear M engages with a similar bevel-gear N on the shaft at right angles thereto, the said shaft carrying a brush holder and brushes engaging with a set
 45 of contacts similar to those described in connection with the ring D'. To bring the gears back to their normal position, a device similar to that described with the vertical movement
 50 is utilized, the only difference being that the cage K' is hinged to the frame O, to allow the point of pivot *k* to travel in the arc of a circle. The contacts on ring D being connected in
 55 the proper manner, any movement of the handle L, either right or left, will cause the brushes to make the desired connections, and the instant the handle is released, it will fly
 60 back to its normal position, due to the action of the spring, as previously described. A switch P is mounted on the base E to open and close the circuit.
 65 It being desirable to have the handle L indicate as far as possible the direction of the beam, the contacts on D' are connected to the motor, which imparts motion to the search light in the vertical plane, while those on ring
 70 D are connected to the motor giving a movement in the horizontal plane.

Referring to Fig. 6, T is the drum of a pro-

jector and *q* *q'* are the contact rings permanently connected therewith. S is the generator, and R is a resistance regulating the current flowing in the lamp. The fields of motors
 70 1 and 2 are permanently connected in shunt to the main generator S, the switch P serving to interrupt the circuit in the controller.

The contacts *a* and *c* are mounted on the
 75 outer insulating rings D² and contacts *b* *b'* are mounted on the inner insulating rings D³.

A current entering the controller by closing the switch P would flow through the field of motor 1 or 2, depending on which way the
 80 operating handle was thrown, or a current would divide and flow through both motors if the handle L were thrown down, and at the same time to the right or left, the same would
 85 be true if the handle were raised, and by so doing a diagonal motion would be imparted to the search light; the angles of the diagonal depending upon the relative speed given the two motors.

What we claim as new, and desire to secure
 90 by Letters Patent of the United States, is—

1. The combination in a controller, of a switch handle adapted to control two motors, separately or simultaneously, with springs
 95 adapted to be compressed by a movement of the handle in any direction, and acting to bring said handle back to the off position.

2. The combination in a controller, of a switch handle adapted to move simultaneously in a horizontal and vertical plane, there-
 100 by imparting a diagonal motion to the handle and springs acting to bring the handle back to its normal position.

3. The combination in a controller, of a switch handle adapted to move from its normal
 105 position in a horizontal and vertical plane, with compression springs mounted in cages and acting to bring the handle back to its normal position.

4. The combination in a controller, of a
 110 switch handle adapted to move above and below its normal plane, with a spring adapted to be compressed from either end by a movement up or down of the said handle.

5. In a single handle controller for two
 115 motors, the combination of a circular rack, a pinion gear engaging with the rack, and adapted to operate the contact brushes for varying the resistance in one motor circuit when actuated in a vertical plane, and remaining idle with
 120 respect to said contact brushes when the handle is moved in a horizontal plane, to vary the resistance in the second motor circuit.

6. In a controller for electric search lights, the combination of a circular operating rack,
 125 a compression spring mounted in a cage tending to keep said rack, in its normal position, with means within the cage for limiting the movement of the rack, a pinion gear engaging with said rack, and adapted to operate con-
 130 tact brushes for varying the resistance in the armature circuit.

7. In a controller for electric search lights the combination of a switch handle adapted

to indicate by its relative angular position the position of the beam, with compression springs mounted in cages with means therein for limiting the angular movement of the handle, said springs tending to hold the handle in its central position.

8. In a controller for electric search lights, the combination of resistance contacts operated by bevel-gears, a spring-actuated rod pivoted to one of said gears for returning them to an intermediate position, said rod being mounted in a cage pivoted at one end, and means within the cage for limiting the movement of said rod.

9. In a controller for electric search lights, the combination of a handle adapted to indicate by its relative angular position the position of the beam, two sets of resistance con-

tacts, brushes for said contacts operated by a rack and pinion in one case, and by bevel gears in the other, and compression springs mounted in cages and arranged to return the brushes to their normal positions.

10. A search light operated by electric motors, in combination with a controller having a switch handle for controlling said motors, adapted to indicate by its relative angular position the angle of the beam.

In witness whereof we have hereunto set our hands this 19th day of January, 1895.

ELIE F. G. H. FAURE.

JOHN MACHAFFIE.

SAM H. LIBBY.

Witnesses:

B. B. HULL,

A. F. MACDONALD.