

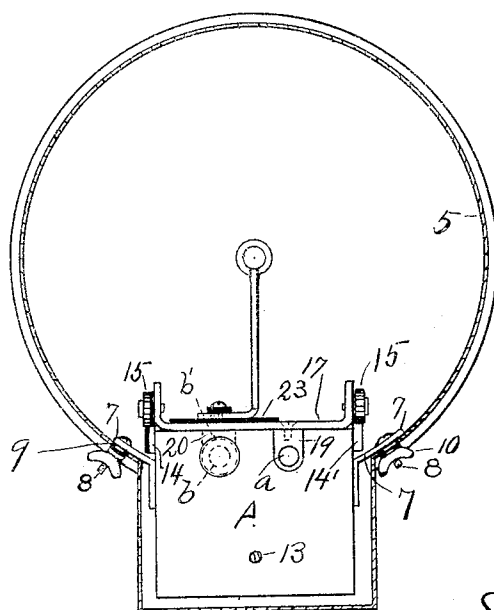
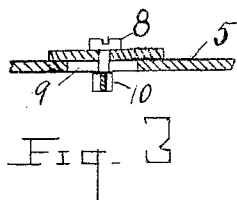
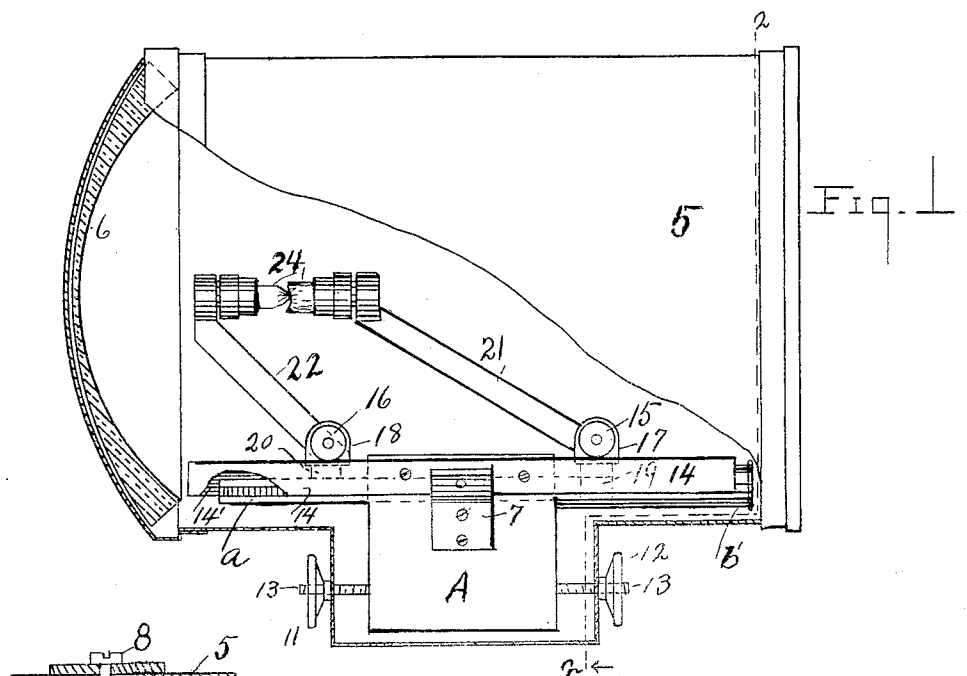
(No Model.)

3 Sheets—Sheet 1.

S. W. RUSHMORE.
ELECTRIC SEARCH LIGHT.

No. 582,694.

Patented May 18, 1897.



WITNESSES:

E. C. Dana

C. L. Belcher

INVENTOR

S. W. Rushmore,

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(No Model.)

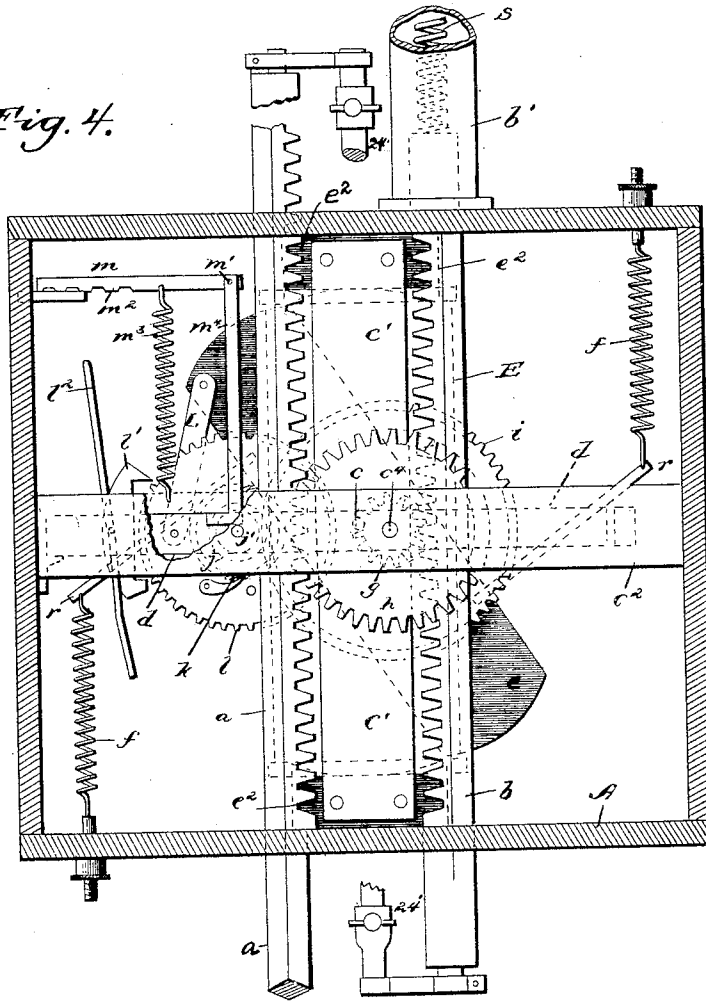
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Fig. 4.



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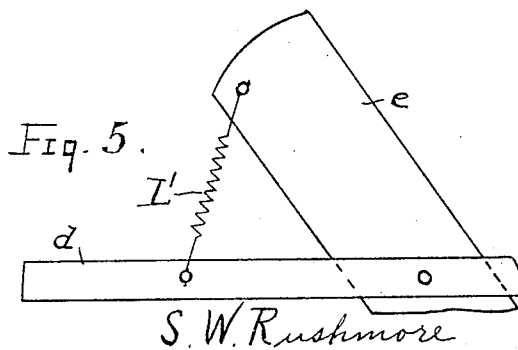
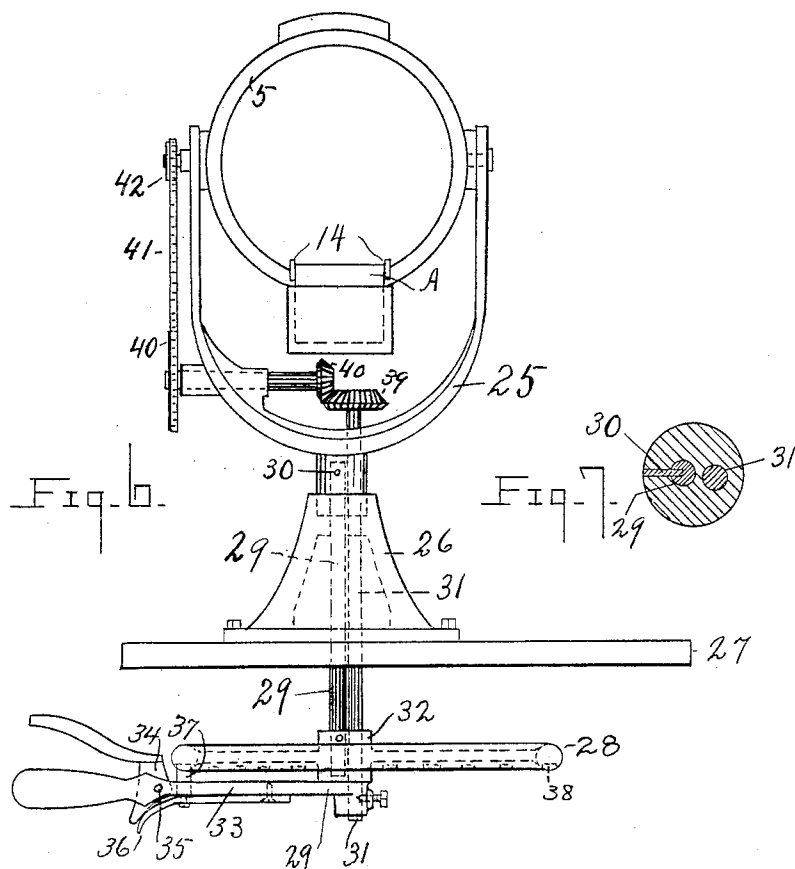
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UNITED STATES PATENT OFFICE.

SAMUEL W. RUSHMORE, OF BROOKLYN, NEW YORK.

ELECTRIC SEARCH-LIGHT.

SPECIFICATION forming part of Letters Patent No. 582,694, dated May 18, 1897.

Application filed January 11, 1896. Serial No. 575,082. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL W. RUSHMORE, a citizen of the United States, and a resident of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Electric Search-Lights, of which the following is a specification.

This invention relates to search-lights, the main objects of the invention being to provide improved carbon supporting and feeding devices and improved means for changing the direction of the search-light in both horizontal and vertical planes.

In the drawings, Figure 1 is a side view, partly in section, of my search-light. Fig. 2 is a section on line 2 2. Fig. 3 shows means for holding the lamp in place and for permitting longitudinal adjustment. Fig. 4 is a plan or side view of the preferred form of lamp. Fig. 5 shows a modification of a detail of the lamp. Fig. 4^a is a partial section on line 4^b 4^b of Fig. 4, the armature and the feed-regulating train being not sectioned. Fig. 6 is a front view of the search-light and means for turning it in different directions, and Fig. 7 is a cross-section of the lower end of the yoke.

5 is the body or cylinder of a projector or search-light, having a reflector 6.

A is the inclosing case of the arc-lamp, so constructed that the carbon-moving rods *a b* will move easily in a horizontal plane.

b' is a tube into which extends rod *b* and which contains a spring *S*. (See Fig. 4.)

7 7 are brackets secured to the lamp-box and resting on the bottom of cylinder 5.

8 are screws extending from said brackets through longitudinal slots 9 in cylinder 5, and 10 are finger-nuts on said screws by which the lamp-brackets may be clamped to the cylinder, and when the nuts are loosened said brackets and the lamp may be adjusted bodily forward or backward, for example, by loosening one of the nuts 11 12 on the outside of the search-light and then turning the other nut to draw the screw and lamp toward it. This adjustment of the lamp parallel with the axis of the reflector makes it possible to place the arc in the desired position relative to the focus of the lens or reflector.

14 14' are horizontal rails secured to the upper corners of the lamp-box and forming a

track parallel with the axis of the reflector, on which wheels or other bearings supporting or partly supporting the carbon-carrying rods may move and enabling the rods to move with very little friction and without binding where they pass through the ends of box A.

15 15 16 16 are wheels adapted to travel back and forth on the rails and connected in pairs by cross-bars 17 18, to one of which rod *a* is connected by a bracket 19 and to the other of which rod *b* is connected by a similar bracket 20 at the opposite end of the box. Bars 17 18 each carry an arm 21 22, insulated therefrom at 23 and supporting carbon-holders 24 in the axis of the reflector. As shown in Fig. 1, the carbons are nearly consumed. With longer carbons in the holders the wheels 15 16 and the arms 21 22 would be near the right and left ends of the rails, respectively, the arc remaining at the same place, the focus. Preferably the carbon farthest from the lens is the larger one, though of the same length as the other, so as to throw as much light as possible on the lens and to produce as small a shadow as possible.

In Fig. 4 the feed mechanism of the lamp is shown. In this figure rails 14, wheels 15 16, and cross-bars 17 18 are omitted. The lamp, as here shown, can be used horizontally, as in Fig. 1, or vertically, as in Fig. 4. This lamp is of the same general construction as the lamp described in my Patent No. 515,022, dated February 20, 1894. The lamp described in the patent is not perfectly balanced, owing to the location of the armature and of the frame *d* on concentric or coincident pivots at the center of the lamp. In the construction disclosed in my patent above mentioned the rods *a b* are necessarily at different distances on opposite sides of the central pivot when geared to wheels of different diameters, which interferes with the symmetry and balance of the lamp. In the construction shown in this application the pivot or shaft of the feed mechanism is at one side of the pivot of the armature a distance approximately equal to the difference in radius of the gear-wheels *g h*, and the rods *a b* are at equal distances on opposite sides of the central pivot *c*, which makes the lamp symmetrical and perfectly balanced. Centrally between rods *a* and *b* is a shaft *c* in bearings formed in the

magnet and in a brass plate c' , secured to the front faces of the magnet-poles e^2 .

d is a frame loosely mounted on a shaft c^4 , so as to be free to turn on said shaft. Shaft c^4 is located at one side of and parallel with shaft c .

E is a magnet the armature e of which occupies an oblique position with respect to the frame d and the magnet. The armature e , movable on its shaft, and frame d , movable on its separate and eccentric shaft, are connected by a link L , so that when the armature moves on its shaft it turns said frame on its shaft. A spring L' may be used with advantage to form said link. This spring reduces the shock to the apparatus when current is first turned on.

e^2 are pole-pieces of the magnet with curved faces between which the armature swings.

ff are springs connected, respectively, between the top and bottom of the box and the rods r , projecting in opposite directions from the armature. As one of these springs is located on each side of the axis of the armature, and as the springs are of equal length and strength, the armature will be perfectly balanced and will move with almost no friction on the axis.

Upon shaft c^4 of frame d are gear-wheels g , h , and i . Wheel g engages with rod b , wheel h with rod a , and wheel i with pinion j on a counter-shaft j' , mounted in frame d . On shaft j' is also a fixed ratchet-wheel k , with which a pawl engages to prevent backward movement, and an escapement-wheel l , with which engages a pallet l' .

The sizes of wheels g h will depend on the relative rate of feed desired for the two carbons. If the carbons are to be fed with equal speed, said wheels will be of equal size, and in this case it is evident the carbon-rods may both engage the same wheel on opposite sides.

Above frame d is a stop-lever m , pivoted at m' to a standard m^4 , which is secured to frame d and moves therewith, so that pivot m' maintains a fixed distance from the frame. Lever m and frame d are connected by a light spring m^3 . The lower edge of the lever is provided with a series of notches with which the vibrating retarding fan or arm l^2 is adapted to engage and thereby be prevented from vibrating. In my patent above referred to this lever m is shown pivoted to a fixed point, a point not moving with frame d . It is found in practice that this sometimes causes the teeth of lever m to hold the fan longer than it should, thus delaying the desired feeding. By mounting lever m so that its pivot is elevated at the same time as frame d the difficulty mentioned is overcome.

When the lamp is not burning, the carbons are in contact. When the current is turned on, magnet E attracts its armature, swinging it on its pivot or shaft, and through link L swinging frame d on its shaft eccentric to the shaft of the armature. The pinion j climbs up on the periphery of wheel i , the arm l^2 pre-

venting a too sudden movement of the frame. The frame is carried up until the vibrating arm engages with lever m . In the further upward movement of the frame wheel i is rotated and its movement is communicated to shaft c^4 and the other two wheels upon it, causing rod b to move downward and the rod a upward, which separates the carbons and establishes the arc. When the current decreases, owing to resistance of the arc, the magnet allows springs f to retract the armature. This movement first lets the lever m down onto its stop and then releases arm l^2 and allows the spring S , above the negative carbon-rod, to rotate the train and move the carbons toward each other. The upper rod moves faster than the lower rod because of the larger wheel being in engagement with it.

The search-light is mounted in a yoke 25, supported by and turnable on a standard 26 on a platform 27.

28 is a hand-wheel on a rod or shaft 29, secured to yoke 25, as indicated by pin 30.

31 is a second rod or shaft parallel to rod 29 and at one side thereof. Shaft 31 has a bearing in hub 32 of wheel 28 and also in the base of the yoke. At its lower end it is provided with a handle 33, which has a lever 34, pivoted at 35, pressed by a spring 36 and controlling the locking-pin 37, adapted to engage and be disengaged from notches 38 in the hand-wheel. At the upper end of shaft 31 is a bevel-gear 39, which drives wheel 40, connected by a chain or belt 41 to wheel 42 on a pivot of cylinder 5. By turning the hand-wheel without disengaging lock 37 the yoke and cylinder will be turned in a horizontal plane only. By disengaging the lock and turning the shaft 31 the cylinder will be tilted up or down in a vertical plane.

In small search-lights the rails and parts coöperating therewith for reducing the friction of the carbon-rods are unnecessary.

I claim—

1. The combination with a search-light cylinder, of an arc-lamp with horizontal carbons in the axis of the cylinder, a spring tending to feed the carbons toward each other, a magnet, an armature pivoted between its poles, a frame carrying a train of gearing and pivoted eccentrically to said armature, carbon-rods engaging respectively with a wheel of said train on opposite sides of the armature-pivot, and a suitable detent for the train.

2. The combination, in an arc-lamp, of an electromagnet, an armature pivoted between its extremities or poles, a frame carrying a train of gearing and pivoted eccentrically to said armature, means for connecting the frame and armature, two carbon-rods at equal distances from the armature-pivot and engaging respectively with opposite sides of two wheels of said train, and upon opposite sides of the armature-pivot, said wheels being eccentric to the axis of the armature, and a detent for the train.

3. The combination, in an arc-lamp, of an

electromagnet, a centrally-pivoted armature, a pivoted frame moving with the armature, two carbon-rods, two gear-wheels respectively in engagement therewith, the rods being located on opposite sides of the central pivot at equal distances therefrom, a detent for said wheels, the armature and wheels being on eccentric axes.

4. The combination, in an arc-lamp, of a shaft, a frame pivoted thereon, an armature, an axis therefor eccentric to said shaft, a connection between the frame and armature, a single-spool magnet with pole-pieces adapted to act on both ends of the armature, a train of gearing carried by the frame, a detent therefor, and two carbon-rods engaging respectively with two wheels of the gearing and on opposite sides of the pivot of the armature.

5. The combination, in an arc-lamp, of two oppositely-moving carbon-rods, a feed-gear, a pivoted frame carrying the gear, an operating-magnet, an armature therefor on a pivot

eccentric to the pivot of the frame, and a link connecting the frame and armature.

6. The combination, in an arc-lamp, of two 25 oppositely-movable carbon-rods, a feed-gear, a pivoted frame carrying said gear, a magnet and armature adapted to move the frame, a standard m^1 carried by said frame, a stop-bar m pivoted to the standard, and a detent in 30 position to be engaged by the stop-bar.

7. The combination of a search-light, a supporting-yoke therefor, a shaft and handle for turning the same in a horizontal plane, a second shaft movable separately from first, 35 parallel but not concentric therewith, and a connection between said shaft and the search-light for moving it in a vertical plane.

Signed this 8th day of January, 1896.

SAML. W. RUSHMORE.

Witnesses:

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