

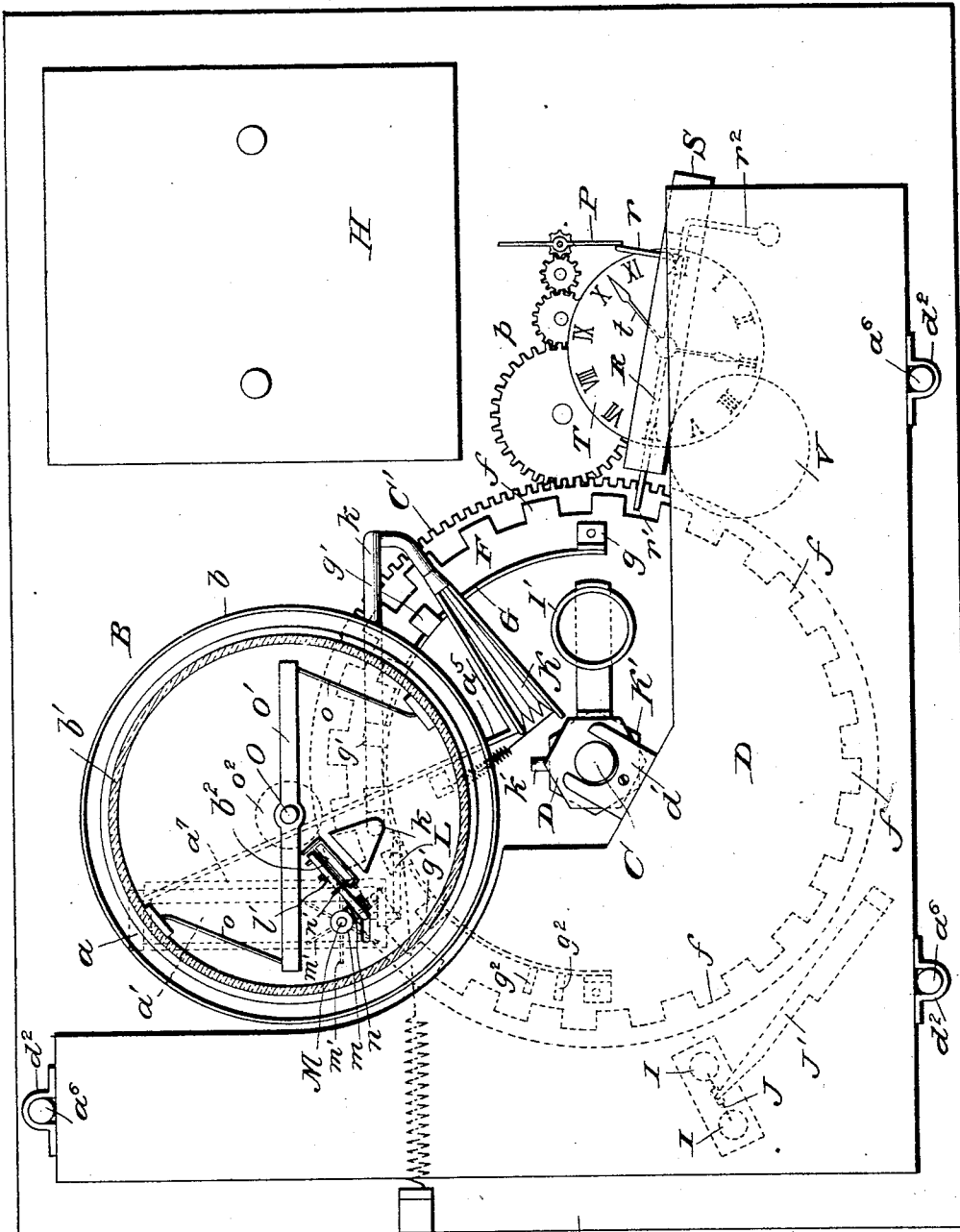
(No Model.)

4 Sheets—Sheet 1.

R. P. NELMS.
AUTOMATIC BEACON.

No. 579,999.

Patented Apr. 6, 1897.



WITNESSES

WITNESSES
L. S. Elliott.

4/5 Grace S. Beall.

Fig. 1.

A

Robert P. Nelms
INVENTOR

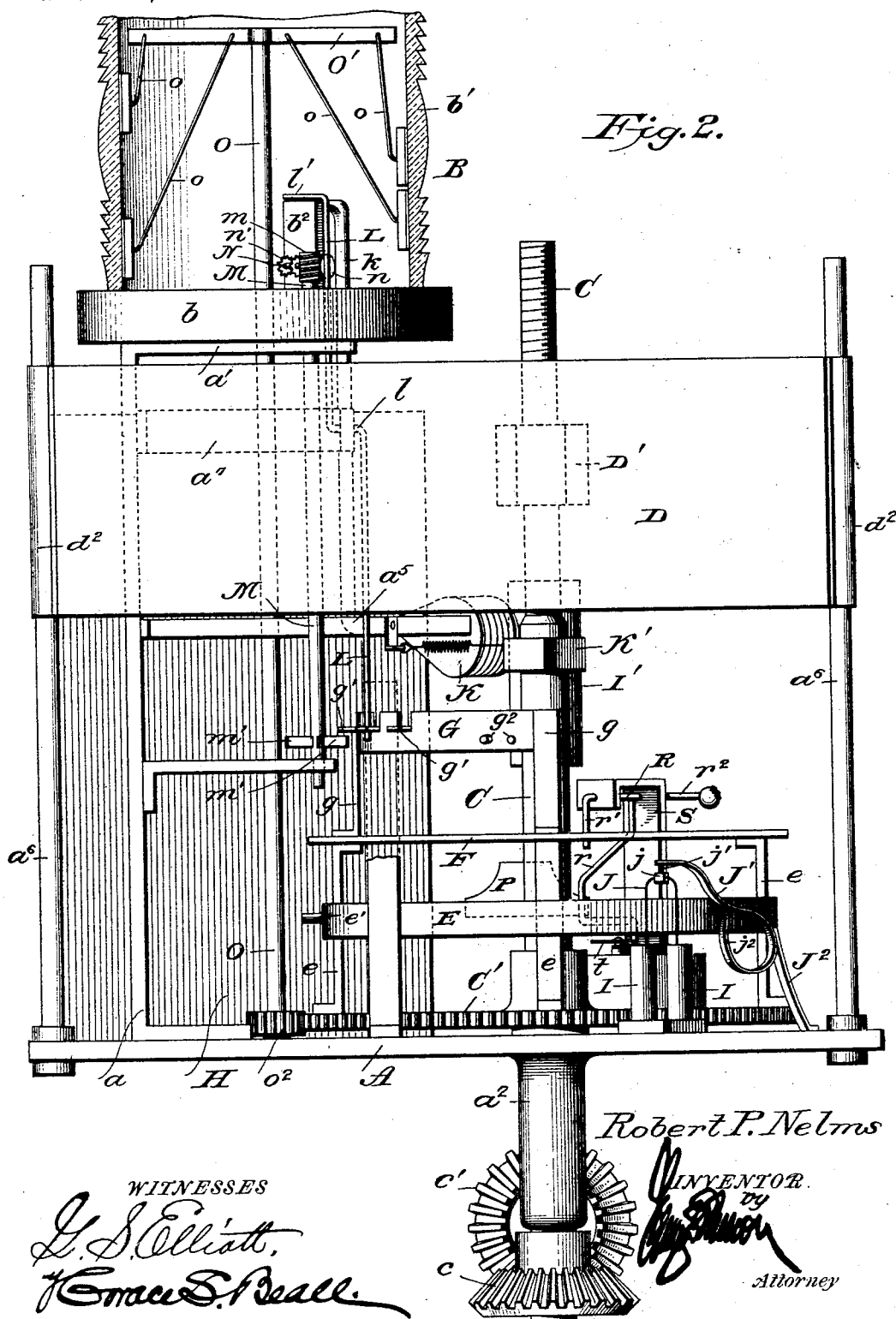
by 

Attorney

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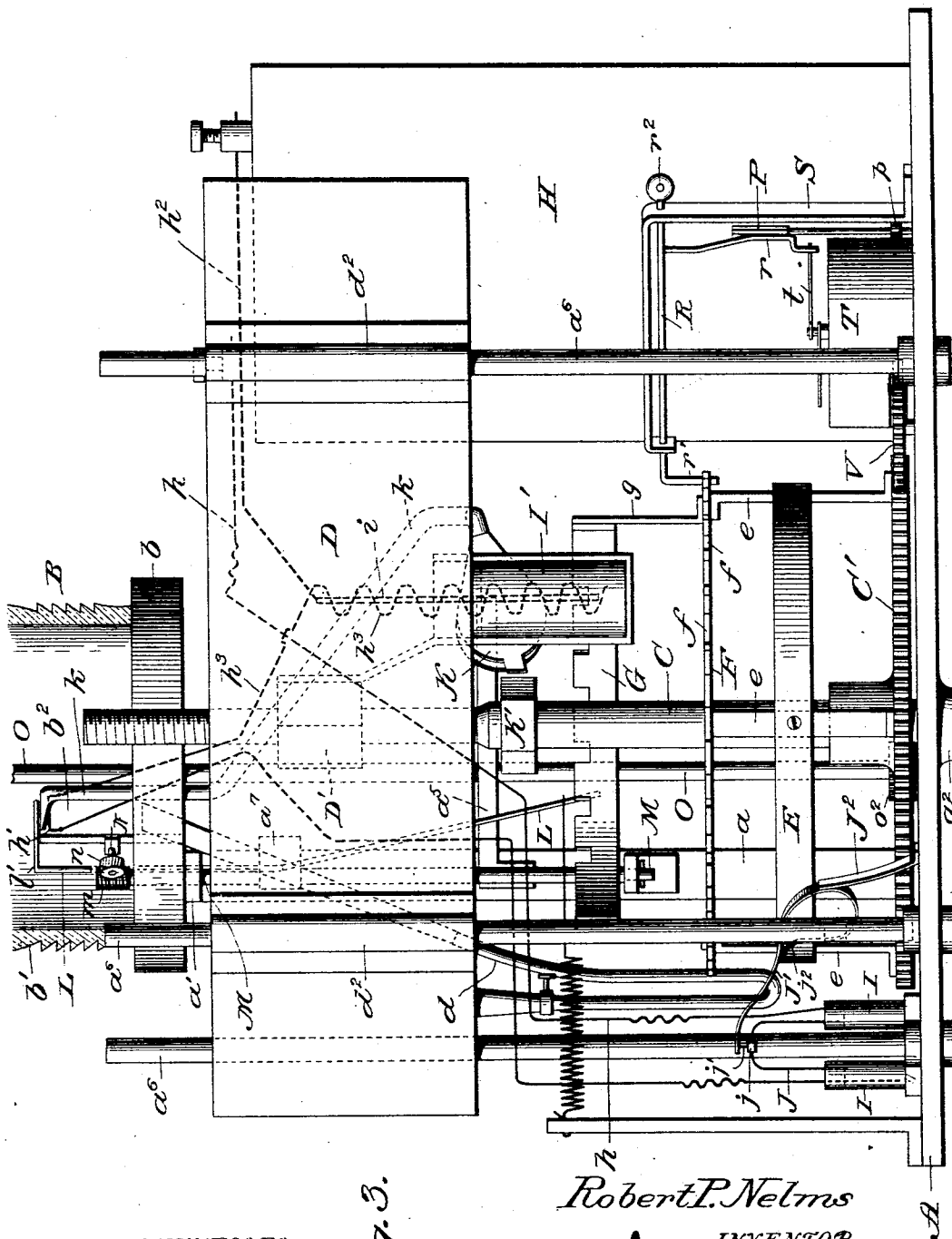
(No Model.)

4 Sheets—Sheet 3.

R. P. NELMS.
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WITNESSES
L. S. Elliott,
Thomas S. Beall.

Fig. 3.

Robert P. Nelms
INVENTOR

by *[Signature]* Attorney

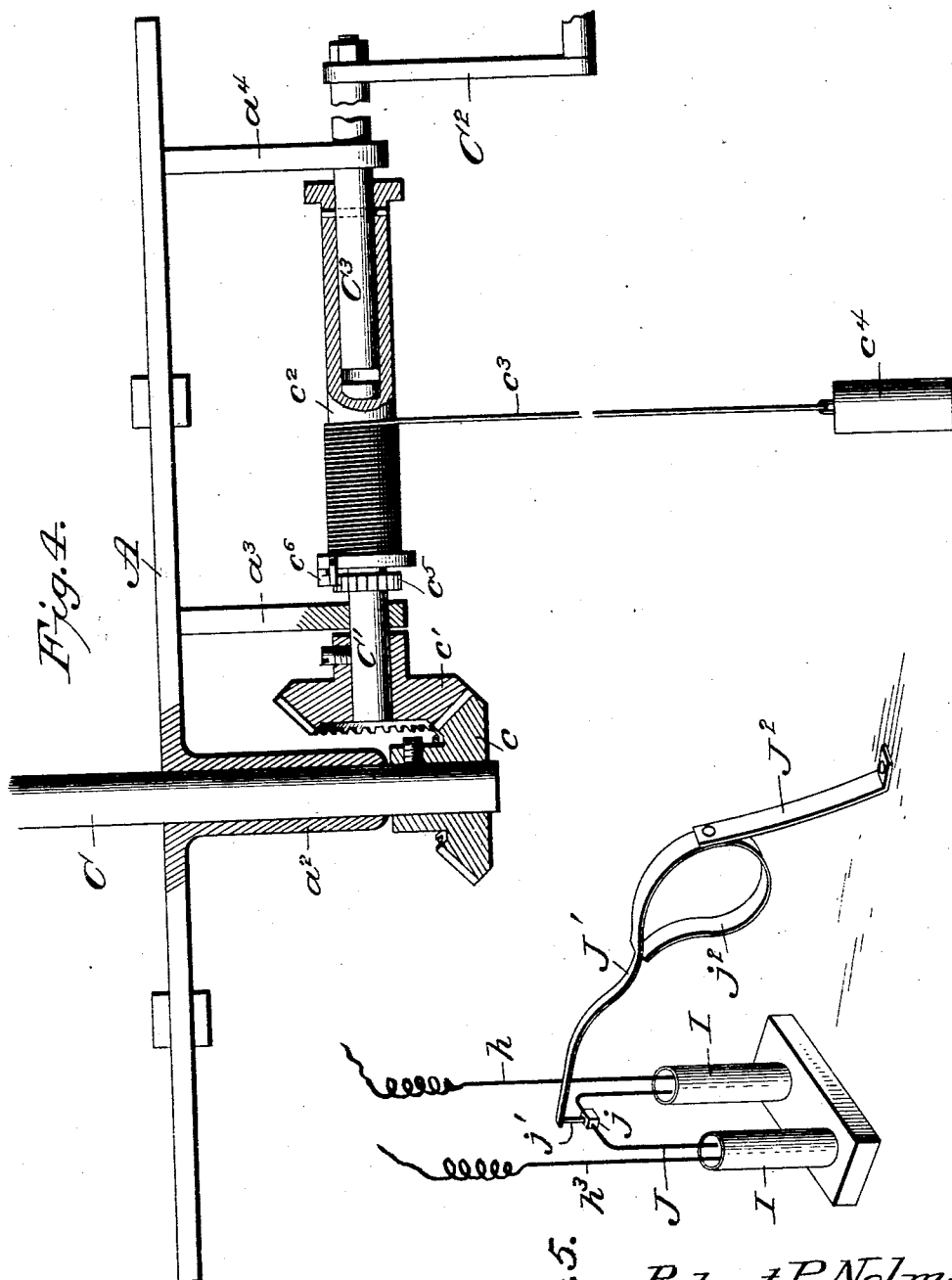
(No Model.)

4 Sheets—Sheet 4.

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WITNESSES
L. S. Elliott.
Thomas S. Beale.

Fig. 5.
Robert P. Nelms
INVENTOR
by [Signature] Attorney

UNITED STATES PATENT OFFICE.

ROBERT P. NELMS, OF JACKSONVILLE, FLORIDA.

AUTOMATIC BEACON.

SPECIFICATION forming part of Letters Patent No. 579,999, dated April 6, 1897.

Application filed April 30, 1896. Serial No. 589,752. (No model.)

To all whom it may concern:

Be it known that I, ROBERT P. NELMS, a citizen of the United States of America, residing at Jacksonville, in the county of Duval and State of Florida, have invented certain new and useful Improvements in Automatic Beacons; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

15 The object of this invention is to provide a beacon or lighthouse with mechanism for automatically lighting the lamp at or about sunset each evening and extinguishing the same at or about sunrise, the apparatus also including mechanisms operated at predeter-
20 mined intervals of time to clean or wipe the globe, trim and raise the wick, and maintain the level of the oil in the reservoir at the proper height with respect to the lamp or
25 burner thereof, an intermittent rotation of the main driving-shaft being governed or regulated by clock mechanism, so that said driving-shaft will be operated at stated intervals instead of continuously.

30 The invention consists in providing a beacon-lamp with mechanism of special construction controlled by a suitable power to automatically light the lamp and extinguish the same at certain or predetermined intervals of
35 time.

The invention further consists in providing a beacon-lamp with mechanisms and devices of particular construction for trimming the wick and for raising the said wick after
40 it has been trimmed.

The invention further consists in operating the igniting and extinguishing devices, as well as the wick trimmer and raiser, from a single driving-shaft and in providing said driving-
45 shaft with a governor to regulate or govern the rotation thereof.

The invention further consists in providing a beacon-lamp with devices and mechanism operating the same to automatically clean or
50 wipe the globe periodically.

The invention further consists in the particular manner of connecting the oil-reservoir

of the lamp with the driving mechanism of the apparatus, so that said reservoir will be gradually raised to maintain the level of the
55 oil at the proper height with respect to the lamp or burner thereof.

The invention further consists in connecting the driving-shaft and governor to clock mechanism, so that the rotation of said driving-shaft will become intermittent; and the invention further consists in the construction and combination of the parts, as will be hereinafter fully set forth, and particularly pointed out in the claims.

65 In the accompanying drawings, forming part of this specification, Figure 1 is a plan view of an automatically-controlled beacon-lamp constructed in accordance with my invention, the upper part of the lamp proper
70 being broken away. Fig. 2 is an end elevation. Fig. 3 is a side elevation. Fig. 4 is a detail view of the weight-motor which drives the main operating-shaft of the apparatus, and Fig. 5 is a detail view of the mechanism
75 for making and breaking the circuit of the electric igniting device.

A designates a base-plate or platform which supports the beacon-lamp and operating mechanisms therefor, and this base-plate may
80 form a part of a lighthouse or other analogous structure. Upon this base-plate is rigidly secured a post or upright *a*, having at its upper end an inwardly-projecting member *a'*, which supports the lamp B, said lamp consisting of the base *b*, globe *b'*, and burner or
85 wick-tube *b²*, the latter being located to one side of the center of the base *b*, so as not to interfere with the operating-shaft of the globe-cleaning device hereinafter described.

90 The upper part of the lamp is provided with a cap or chimney. (Not shown, but of the usual construction employed upon lamps of an analogous nature.)

C designates the main driving-shaft of the
95 apparatus, which is vertically disposed and passes through the base-plate A and bearing *a²*, depending therefrom, said shaft carrying a large gear-wheel *C'*, which is keyed thereto and bears upon the base-plate to support the
100 shaft. To the lower end of the shaft C is attached a bevel-wheel *c*, which is in mesh with a bevel-wheel *c'* on a horizontal shaft *C''*, journaled in a bracket or hanger *a³*, depending

from the base-plate A. The end of the horizontal shaft C' opposite the bevel-wheel c' projects beyond the hanger a³ and forms a bearing for one end of a drum c², which is adapted to turn freely thereon, the opposite end of said drum being keyed or attached to a shaft C³, journaled in a bracket or hanger a⁴, depending from the plate A, and this last-mentioned shaft is provided with a crank-handle C², by means of which the drum is turned to wind a cord or flexible connection c³ thereon, said cord or flexible connection being attached to a weight c⁴. The shaft C' is connected to the drum c² by means of a ratchet c⁵ and pawl c⁶. By this arrangement the specific gravity of the weight c⁴ will turn the drum c², and as the drum is connected to the shaft C' by the pawl and ratchet said shaft will be turned and communicate the motion to the main driving-shaft C through the intervention of the bevel-wheels c and c', thus providing an effective and practical weight-motor for operating the main shaft, from which the mechanisms to be hereinafter described are driven. It will be here noted that in elevating the weight by means of the crank-handle the pawl escapes or moves over the teeth of the ratchet-wheel, and when the drum is rotated by the weight the said pawl engages said ratchet-wheel to turn the shaft C', and consequently the main driving-shaft, as hereinbefore stated. The rotation of the main driving-shaft is regulated or governed by a governor hereinafter described.

D designates the oil-reservoir for the lamp B, which is preferably of the configuration shown in the drawings, so as not to interfere with the other mechanisms of the apparatus, and said reservoir is connected to the wick-tube b² of the lamp by a flexible tube d, by which the wick is supplied with oil. In order to maintain the proper oil-level in the tube d, the reservoir is gradually raised by the main driving-shaft C, the upper portion of said shaft being threaded to engage the threads of a nut D', mounted thereon and connected to the reservoir by an angle-plate or bracket d', so that as the shaft is rotated it will gradually raise the nut, which will carry the reservoir with it. The reservoir is guided by means of posts or uprights a⁶, which are embraced by loops d², secured to said reservoir.

Upon the main shaft C, a suitable distance above the gear-wheel C', is mounted a disk E, and above this disk is also mounted a second disk F, the gear-wheel C' and disks E and F being connected to each other at or near their outer edges by vertical strips or standards e e, so that they will all move in unison with the driving-shaft. The upper disk F carries a segment-plate G, which is supported a suitable distance above said disk by means of standards g. The disk E is provided on its periphery with one or more studs e', adapted to operate to make and break the circuit of an electric igniting device for the lamp, said igniting device consisting of wires

which extend from the positive and negative poles of a battery H, supported upon the base-plate A, one of the wires having a platinum section which adjoins the upper end of the wick-tube and extends therefrom to a contact-point adjacent the disk E, while the other wire extends directly to the contact-point, so that the circuit will be completed by the stud e', as I will now proceed to more fully describe.

I I designate cells containing mercury and supported upon the base-plate A, and a wire h, which extends directly from one of the poles of the battery H, is let into the mercury of one of the cells, while the wire from the other pole of the battery is let into the mercury of the second cell, this last-mentioned wire having an interposed resistance adjustment and a platinum section h', which adjoins the upper end of the wick-tube. The resistance adjustment comprises a cell I', containing mercury and suspended from the nut D'. Within this cell a metal rod i is centrally suspended and connected at its upper end to a wire h², leading from the battery, and one end of the section or wire h³, forming a continuation of the wire h², is formed into a coil or helix, which encircles the rod i and depends into the mercury of the cell I', the other end of said wire h³ being let into the mercury of one of the cells I, as hereinbefore stated. It will be seen that by the raising of the nut D' the cell I' will be raised, thereby more deeply submerging metal rod i and rod h³, which shortens the resistance-coil and so allows the current an easier path as the battery becomes exhausted by use. From the foregoing it will be noted that the cells I I form the contact-points at which the circuit is made and broken, and in order to make and break the circuit at the proper time to cause a lighting of the wick through the medium of the platinum section h' a yoke J is suspended above said cells, so that the lower ends thereof will normally lie or rest above the mercury therein. This yoke is provided with a non-conducting block j, which is connected by a link j' to the outer end of a flat spring J', said spring being looped to provide a lower section j², which is tempered so as to be of greater resiliency than the upper part, the spring being secured at its looped portion to an arm or support J², rigidly secured to the base-plate A. The circuit is made or completed when the ends of the yoke J touch the mercury or contact-points I I, and this operation is accomplished by the stud e' passing into the loop and depressing the lower member j² of the spring, so that the upper member will be allowed to fall and carry the yoke with it, and when the stud passes beyond the end of said lower section the latter will be released, so that the spring tendency of the same will move the other parts to their normal position.

The device for extinguishing the lamp consists of a bellows K, which is attached to an

arm a^3 , projecting from the upright a , and is provided with a tube k , extending therefrom to a point on a line with the upper end of the wick-tube b^2 , so that the operation of the bellows will force the air through the tube k and against the upper end of the wick to blow out the flame. The bellows is operated by a stud k' , projecting from a collar K' , rigidly secured to the main driving-shaft C. I prefer that the stud shall be a set-screw for adjusting the collar on the shaft to properly position the said stud with respect to the other parts of the apparatus. When the shaft C is rotated, the stud k' engages the movable board of the bellows and moves it away from the stationary board, so as to fill the bellows, and a further movement of the stud will release the said movable board, thereby operating the bellows to force the wind through the tube k for the purpose mentioned. It may be here mentioned that the shaft C makes one complete revolution every twenty-four hours, and by properly positioning the studs e' and k' the lamp can be lighted and extinguished at any time during the said twenty-four hours, and in practice I prefer to provide more than a single stud e' , so that the electric lighting apparatus will be operated every hour during the night to thereby again light the lamp should the same be extinguished from any cause.

The devices for trimming the wick and raising the same are constructed as follows: A vertical rod L is provided with an offset portion l , which bears in a bracket a^7 , supported by the upright a , and the upper end of this rod has a projection which normally lies to one side of the upper end of the wick-tube, while the lower end of said rod is positioned in the path of projections g' of the segment-plate G, so that when the segment-plate is moved one of the projections g' will move the lower end of the rod L outward and the upper end thereof away from the wick-tube, and when the rod escapes the projection the said upper end will fly back and the spring tendency of the rod will allow the portion l to move rapidly back and forth across the upper end of the wick-tube, removing the charred portion of the wick. This operation is repeated according to the number of projections g' , so as to effectively trim the said wick. The wick-raising device comprises a vertical shaft M, having a worm m at its upper end in mesh with a worm-wheel n on a transverse shaft N, journaled in bearings on the wick-tube b^2 , and having the usual spur-wheels n' , which pass through said wick-tube and engage the wick. The lower part of the vertical shaft M is provided with radial arms m' , which are engaged by one or more projections g^2 on the segment-plate G and are acted upon to turn the shaft M, which movement being communicated to the transverse shaft N through the intervention of the worm and wheel will operate the spur-wheels n' to raise the wick. The projection g^2 is so located on

the segment-plate G that the operation of raising the wick will take place after the operation of trimming said wick, and if desirable a projection g^2 could be located below one of the intermediate projections g' , so that the wick could be slightly raised during the operation of trimming the same. The segment-plate G and projections g' and g^2 thereon are so located with respect to the other parts of the apparatus that the operations of trimming and raising the wick will occur during the day.

The device for cleaning the globe consists of a vertical shaft O, which is journaled at its lower end in the base-plate A and extends up through the base b of the lamp, the upper end of said shaft being provided with a cross-bar O' , having depending rods o , carrying brushes or blocks with cloth faces, which bear against the inner side of the globe. These blocks are located at different elevations, so that when the cross-bar is rotated said brushes will operate upon the entire inner surface of the globe. The lower end of the vertical shaft O has a pinion o^2 thereon, which meshes with the gear-wheel C', from which the said shaft derives its rotary motion.

As before stated, the shaft C makes one complete revolution every twenty-four hours, and in order to insure this movement I provide a governor and clock mechanism, the latter regulating or controlling the operation of the former. The governor consists of a train of gearing comprising a number of gear-wheels p , gradually decreasing in size, the largest gear-wheel being in mesh with the gear-wheel C', while the smallest is provided with a fan P. The rotation of this fan is stopped by an arm r , which depends from a transverse shaft R, journaled in a bracket or standard S, mounted on the base-plate, and this arm is extended so that the lower end thereof will lie in the path of the minute-hand of a clock T, which rests upon the base-plate A. By this arrangement at each revolution of the minute-hand it will trip the arm r or move it out of engagement with the fan P and permit a partial rotation of the main driving-shaft C or until the arm is released by said minute-hand, and in order to provide for a uniform movement of the driving-shaft or gear-wheel C' the disk F is provided with a number of peripheral projections f and the transverse shaft R is provided with a depending member R' , which is engaged by said projections so as to hold the arm r out of engagement with the fan until the arm r' is released, a weighted or spring-actuated arm r^2 being employed to return said transverse shaft or arm r to its normal position in the path of the fan P. When the minute-hand moves the arm r out of engagement with the fan and before the minute-hand releases said arm, the disk F will have moved a sufficient distance to bring the tooth or projection f adjoining the arm r' in engagement with said arm, and will thereby hold the arm r out of

the path of the fan till the arm r' falls into the space between the teeth or projections f , during which time the minute-hand has moved sufficient to be out of the path of the arm r . Consequently, as the disk F is provided with twenty-four projections and is rigidly connected to the driving-shaft C , said driving-shaft will make a complete revolution every twenty-four hours, and the clock may be kept wound by connecting or gearing the wheel of the mainspring to the gear-wheel C' through the interposition of the gear-wheel V .

In operation the several parts of the apparatus are properly adjusted with respect to each other so that the lamp will be lighted at or about sunset and extinguished at or about sunrise and the wick trimmed and raised during the period of time which elapses between the extinguishing of the lamp and the subsequent lighting of the same, the operation of cleaning the globe being practically continuous. Now when the parts are so adjusted, and supposing the apparatus to be at the point of lighting the lamp, with the stud e' bearing slightly upon the member j^2 of the spring J' , the hour-hand of the clock T will trip the arm r , releasing the fan P , which will permit the mechanism to be operated by the weight-motor to turn the disk F a short distance, regulated or governed by the arm r' , and during this movement the stud e' will depress the member j^2 and complete the circuit of the electric igniting device by submerging the ends of the yoke J into the mercury-cells I , and as the disk F and mechanism controlled thereby move the distance of one tooth f every hour the extinguishing of the lamp is governed by the position of the stud k' with respect to said teeth. Therefore if it is desired to extinguish the lamp twelve hours after being lighted the stud k' would be adjusted or placed in position to engage the bellows when the disk F has moved twelve teeth. During this intervening time only the globe-cleaning device is operating, for not until after the extinguishing of the lamp does the segment-plate G reach its position to begin the operation of trimming and raising the wick, which operation, as before stated, is accomplished by the projections g' and g^2 , the former operating the vertical rod L and the latter turning the shaft M , so that the wick will be trimmed and raised during the day to be in position to be lighted at sundown. The movement of the globe-cleaning device, as well as that of the tank or reservoir, is practically continuous or takes place at each intermittent movement of the gear-wheel C' .

From the foregoing description it will be observed that every part of the apparatus is entirely automatic, and therefore the attention of an attendant is only required to wind up the weight and replenish the battery when these devices have run down. It will also be understood that any suitable motor could be substituted for that shown and described and that other parts of the apparatus might be

modified or changed within the spirit and scope of my claims.

Having thus described the construction and operation of the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination in an automatic beacon, of an electric igniting device for the lamp consisting of a battery, mercury-cells I , independent wires leading from the poles of the battery to said mercury-cells, a yoke the ends of which are adapted to be submerged in the mercury-cells, and means operated from a suitably-governed motor for raising and lowering the yoke to make and break the electric circuit, one of the wires having a platinum section adjoining the upper end of the wick of the lamp, substantially as set forth.

2. The combination in an automatic beacon, of an electric igniting device for the lamp consisting of a battery, mercury-cells I , independent wires leading from the poles of the battery to said mercury-cells and having a platinum section at the upper end of the wick of the lamp, an electric conductor or yoke normally supported above the mercury in the cells by a spring, and a stud operated by a suitably-governed motor for depressing the yoke against the action of the spring to make and break the electric circuit, substantially as shown and for the purpose set forth.

3. The combination in an automatic beacon, of an electric igniting device for the lamp consisting of a battery H , mercury-cells I , independent wires leading from the poles of the battery to said mercury-cells and having a platinum section at the upper end of the wick of the lamp, an electric conductor or yoke J , a spring connected to the yoke by an interposed non-conducting element said spring being looped to provide a lower member of greater resiliency which bears against the part carrying the yoke, and a stud or projection operated by a suitably-governed motor to depress the lower member of the spring to submerge the ends of the yoke in the mercury-cells and thereby complete the electric circuit, substantially as shown and for the purpose set forth.

4. The combination in an automatic beacon, of a device for extinguishing the lamp consisting of a bellows one board of which is stationary and the other spring-actuated toward the said stationary board, together with means operated from a suitably-governed motor to move the spring-actuated board and release the same, the bellows discharging at the upper end of the wick-tube of the lamp, substantially as shown and for the purpose set forth.

5. The combination in an automatic beacon, of a device for extinguishing the lamp consisting of a bellows one board of which is stationary and the other movable and spring-actuated toward said stationary board, a tube leading from the bellows to the upper end of the wick-tube of the lamp, together with a stud

or projection operated from a suitably-driven shaft to move the movable board against the action of the spring and then release the same, substantially as shown and for the purpose set forth.

6. The combination in an automatic beacon, of a wick-trimming device consisting of a vertical rod supported at an intermediate point and provided at its upper end with a laterally-projecting portion which normally lies to one side of the upper end of the wick-tube of the lamp, and a segment carried by a shaft driven from a suitably-governed motor and provided with projections adapted to engage the lower end of the rod to oscillate said rod, substantially as shown and for the purpose set forth.

7. The combination in an automatic beacon or apparatus comprising an electric igniting device, extinguishing mechanism and wick trimming and raising devices, substantially as set forth, of a main shaft carrying means for successively operating the aforesaid mechanisms or devices at predetermined periods of time, and a suitably-governed motor for regulating the rotation of said main shaft.

8. The combination in an automatic beacon, of a globe-cleaning device for the lamp consisting of a vertical shaft, a cross-bar attached thereto, and brushes or wiping-surfaces connected to said cross-bar, together with a suitably-governed motor geared to the vertical shaft, substantially as shown and described.

9. The combination in an automatic beacon, of a globe-cleaning device consisting of a vertical shaft, brushes or wiping means carried by said shaft and bearing against the inner surface of the globe, together with a suitably-governed motor geared to said shaft, substantially as shown and described.

10. The combination in an automatic beacon, of a globe-cleaning device consisting of a vertical shaft, a cross-bar attached thereto, brushes or wiping-surfaces suspended from said cross-bar, said wiping-surfaces being at different heights from the base of the lamp and engaging the interior surface of the globe, together with a suitably-governed motor geared to the vertical shaft, substantially as shown and described.

11. The combination in an automatic beacon, of a main shaft provided with a threaded upper portion and driven from a suitably-governed motor, substantially as set forth, a nut in engagement with the threaded portion of the shaft, an oil reservoir or tank supported by said nut and guided by uprights or posts, and a flexible tube extending from the reservoir or tank to the wick-tube of the lamp, substantially as shown and described.

12. The combination in an automatic beacon or apparatus comprising an electric igniting device, extinguishing mechanism, and wick trimming and raising devices, substantially as set forth; of a main shaft carrying means for successively operating the aforesaid mechanisms or devices, a motor geared to said shaft, a governor also geared to said shaft, a

clock, and means actuated by the clock for engaging and releasing the governor at certain intervals of time, substantially as shown and for the purpose set forth.

13. The combination in an automatic beacon or apparatus comprising an electric igniting device, extinguishing mechanism, and wick trimming and raising devices, substantially as set forth; of a main shaft carrying means for successively operating the aforesaid mechanisms or devices, a motor geared to said shaft, a governor also geared to said shaft, a clock, and an arm or rod normally lying in the path of the governor and of the minute-hand of the clock, whereby the governor is engaged and released by the arm or rod which is actuated by the said minute-hand, substantially as shown and described.

14. The combination in an automatic beacon or apparatus comprising an electric igniting device, extinguishing mechanism, and wick trimming and raising devices, substantially as set forth; of a main shaft carrying means for successively operating the aforesaid mechanisms or devices, a motor geared to said shaft, a governor also geared to said shaft, and a disk attached to the shaft and provided with peripheral teeth or projections; together with a clock, and a horizontal shaft having an arm which engages the teeth or projections of the disk and a second arm which normally lies in the path of the governor or fan thereof and in the path of one of the hands of the clock, substantially as shown and for the purpose set forth.

15. The combination in an automatic beacon or apparatus comprising an electric igniting device, extinguishing mechanism, and wick trimming and raising devices, substantially as set forth; of a main shaft carrying means for successively operating the aforesaid mechanisms or devices, a motor consisting of a stub-shaft geared to the main shaft, a supplemental shaft carrying a drum which is connected to the stub-shaft by a pawl and ratchet, and a rope or flexible connection attached to the drum and carrying a weight at its free end, together with a governor and means for regulating the rotation of the main shaft, substantially as shown and described.

16. The combination in an automatic beacon or apparatus comprising an electric igniting device, extinguishing mechanism, and wick trimming and raising devices, substantially as set forth, of a main shaft carrying means for successively operating the aforesaid mechanisms or devices, a motor geared to said shaft, and a governor and clock both geared to said shaft, the governor having a fan, together with an arm or rod normally lying in the path of the fan and of one of the hands of the clock, whereby the fan is engaged and released by the arm or rod which is actuated by the said hand of the clock, substantially as shown and described.

17. The combination in an automatic beacon or apparatus comprising an electric igniting

device, extinguishing mechanism, and wick trimming and raising devices, substantially as set forth; of a main shaft the rotation of which is controlled by a suitably-governed motor, and means carried by the shaft for operating the aforesaid mechanisms or devices, said means consisting of a disk E having a lug or contact e' , a collar K' having a stud k' , and a segment-plate G provided with projections g and g' , the stud k' being adjustable

with respect to the position of the lug e' , substantially as shown and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

. ROBERT P. NELMS.

Witnesses:

C. E. BELL,

J. S. BELL.