3 Sheets—Sheet 1.

J. FORREST.

Self-Lighting Lamps for Light-Houses.

No. 204,806. Patented June 11, 1878.

Fig. 1.

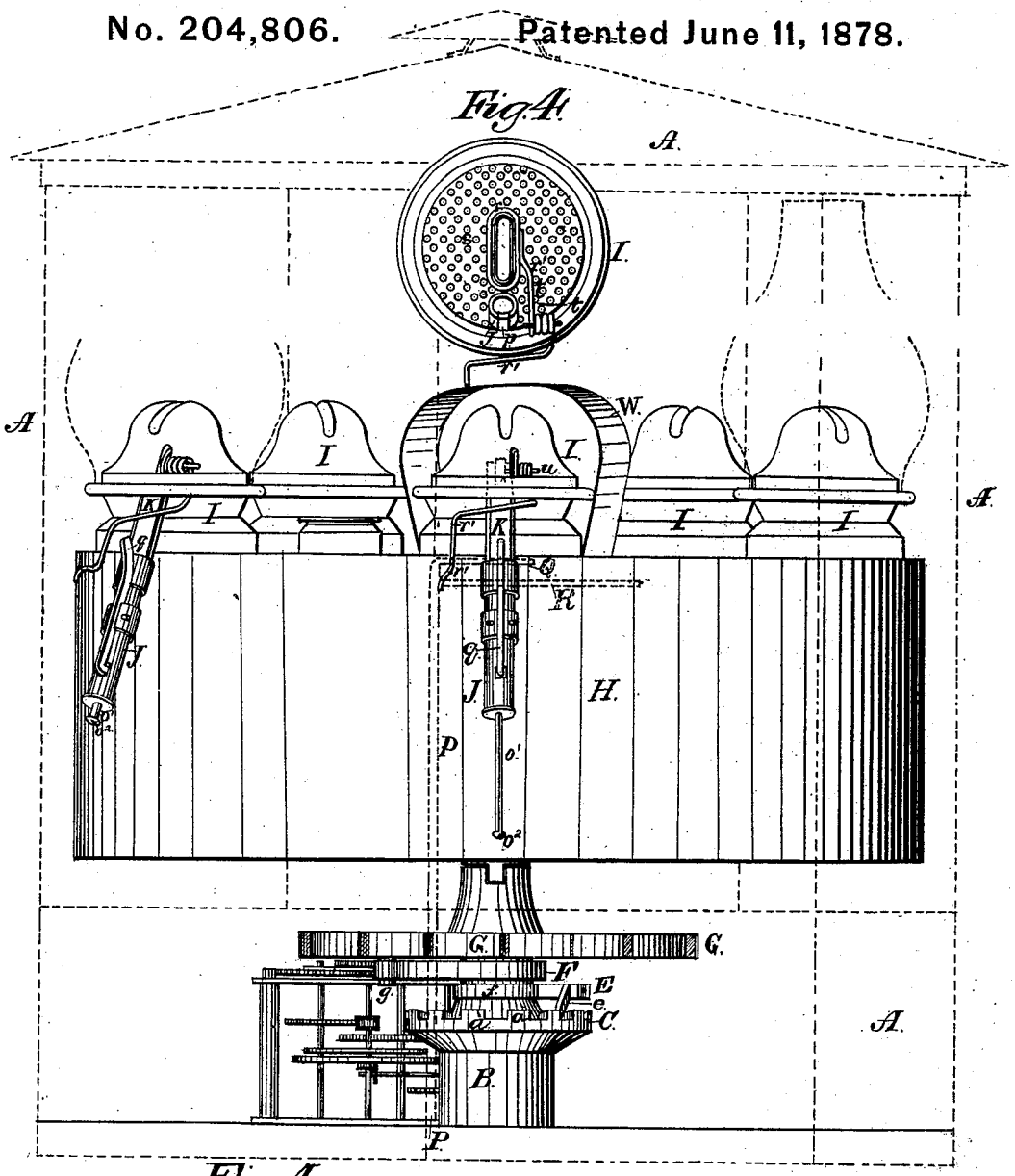

Fig. 1.

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Fig 2.

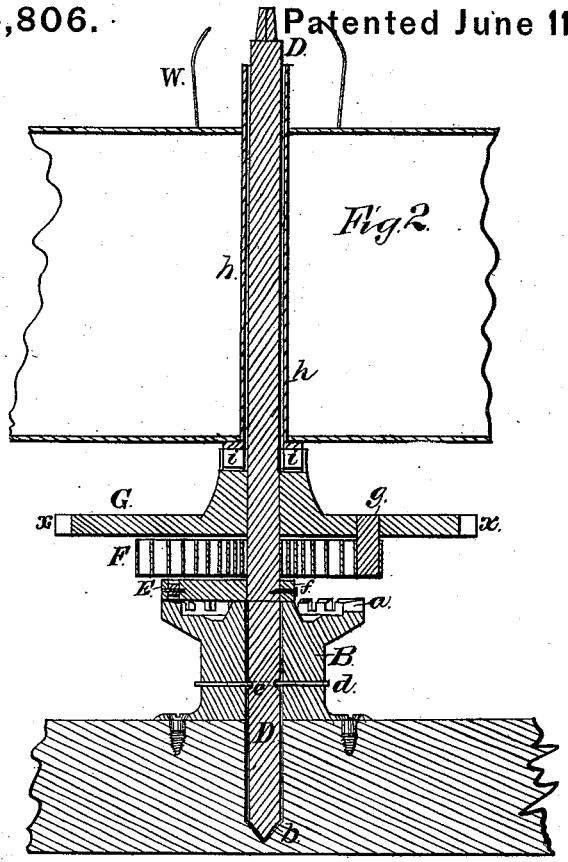

Fig 3.

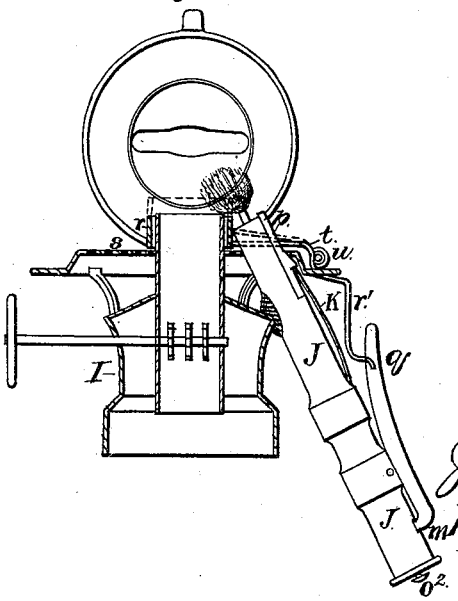

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Fig. 5.

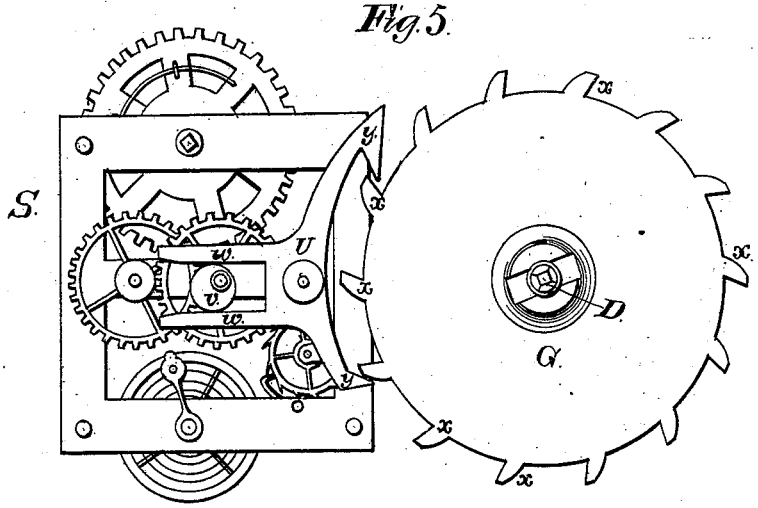

Fig. 6.

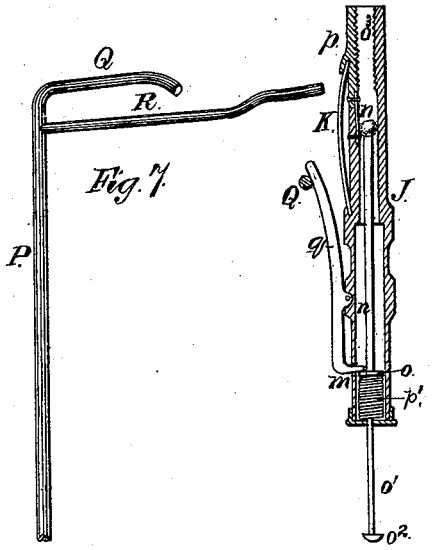

Fig. 7.

Fig. 8.

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UNITED STATES PATENT OFFICE.

JOSEPH FORREST, OF OAKVILLE, MARYLAND.

IMPROVEMENT IN SELF-LIGHTING LAMPS FOR LIGHT-HOUSES.

Specification forming part of Letters Patent No. **204,806**, dated June 11, 1878; application filed May 14, 1878.

To all whom it may concern:

Be it known that I, JOSEPH FORREST, of Oakville, in the county of St. Mary's and State of Maryland, have invented certain new and useful Improvements in Self-Lighting and Self-Extinguishing Revolving Lamps for Light-Houses, Buoys, Wharves, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, which 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, in which—

Figure 1 represents a side elevation of the lamp-reservoir, lamps, and actuating devices for revolving the lamp, with the lantern-frame and the lamp-chimneys shown in dotted lines. Fig. 2 represents a section taken vertically through the reservoir and spindle on which the lamps revolve, and also through the stop-plate and devices for revolving the lamps on the stop device being released, to show details of construction, the oil-reservoir being broken off. Fig. 3 represents a partial vertical section taken through one of the lamp-tops, the cone or burner being thrown back or raised, and, like the lighting device, shown in elevation. Fig. 4 represents a plan of the lamp-top, with its cone or burner removed to illustrate the details of the extinguishing device. Fig. 5 represents a plan of the clock-movement, releasing device, and stop device through which an intermittent revolving motion is imparted to the lamps. Fig. 6 represents a detached sectional view of the lamp-lighting device, taken longitudinally through its center to show its details and construction. Figs. 7 and 8 represent a side elevation and plan of the cam devices for releasing the plunger of the lighting devices and for operating the lamp-extinguishers.

My invention relates to a self-lighting lamp for use on buoys, piers, wharves, light-houses, and other places, so as to dispense with the daily attentions of an attendant.

My invention consists, first, in combining a series of lamps with a time-movement, whereby it is made to perform a partial revolution at stated intervals, and for purposes hereinafter to be described; second, in combining, with each of a series of lamps having an intermittent revolving motion, a self-lighting device put in action by said motion and suitable devices for that purpose; third, in combining, with each of a series of lamps having an intermittent revolving motion, an extinguishing device put in action by said motion and a suitable device for that purpose.

In the drawing, A represents an open frame or lantern, of suitable construction, in which the lamps are mounted, and which may also be of any suitable shape, such as round or polygonal, and the sides of which are covered in any suitable way with panes of glass to exclude the wind. On the bottom of this lantern-frame is secured a short stud, B, on which is formed or otherwise secured a stationary ratchet-disk, C, provided with a series of teeth or notches, *a*.

Standard B is provided with a tubular opening through its center for the reception of a spindle or stem, D, and which rests in a step, *b*, formed in the lantern-bottom, or, if desired, it may be formed in the lower part of the standard B.

A circular groove, *c*, is formed at the lower end of spindle D around its periphery, for the reception of a pin, *d*, which passes through the stud B and lies in the groove *c* of the spindle D, and thereby, while holding the latter in place, leaves it free to turn or revolve in its bearing in the stud, for a purpose to be hereinafter described.

On spindle D, immediately above stud B and its ratchet-disk C, is rigidly secured, in any suitable and known way, an arm, E, to the outer end of which is pivoted a drop-pawl, *e*, and which is intended to engage with the teeth *a* of the stationary ratchet-disk C, for a purpose to be hereinafter described.

In the drawings, arm E is represented as being formed on a collar, *f*, and the latter mounted on and secured to the spindle by a set-screw.

Immediately above the collar *f* and arm E is arranged a strong spiral spring, F, the inner end of which is secured to the spindle D, and the outer one to a wrist pin or stud, *g*, secured to the under side of the toothed release-disk G, and which latter is also mounted upon and rigidly secured to spindle D. The hub

of disk G is raised above its face in cone form, and on its upper side is provided with one or more notches for the reception of one or more lugs or detents, *i*, formed on the lower end of the tubular portion *h* of the oil-reservoir, and which thereby connects the oil-reservoir and lamps with the release mechanism and spindle.

On the stem or spindle D is mounted the oil-reservoir H, and which for this purpose has a tube, *h*, running through its center, and secured, respectively at its upper and lower end, to the top and bottom of the reservoir, with an air and water tight joint. Through this tube the spindle passes, and is made to fit it snugly, but without binding. Into the top of this reservoir H is fitted in the usual manner the lamp-tops I, and which may be of any suitable construction, whether for burning with or without a chimney; but a chimney-lamp is preferred. To each of these lamp-tops (see Figs. 3, 4, and 6) is secured a lighting apparatus, J, of any approved or suitable construction, in such manner that the open end is within convenient distance of the wick, in order to light it when the match-light is struck. For this purpose the upper end of the lighter J passes into the lamp-shell underneath the cone or burner. A lighter suitable for the purpose is shown in section in Fig. 6, in which J represents an elongated cylindrical metal case, soldered or otherwise made fast to the lamp-top, as shown in Fig. 3. Into the lower end of this case is arranged a plunger, *o*, carrying a stem, o^1, and knob or button o^2. Around stem o^1, between the plunger and end of the case, is arranged a spiral spring, *p'*, and which imparts motion to the plunger when the latter is released from the pivoted lock-stop *q*. Lock-stop *q* consists of a bent lever, pivoted to the side of the case J, and having a bent end, *m*, which is made to protrude into the interior of the case J through an opening formed in its side for that purpose.

By this construction, on drawing the plunger *o* down by the stem o^1 below the bent end *m* of the lever *q*, and then pressing it in above the plunger, the latter will be held in that position until released by pressing the lever inward toward the casing. In this position the spring *p'* is held in a compressed position, so that when the plunger is released from lock-stop *q* the plunger *o* is forced rapidly forward, pushing before it the match *n*, and igniting it by causing its end which carries the fulminate to chafe against the roughened surfaces o^3 formed on the inside of the upper end of the casing. That the match may be easily inserted, one side of the upper end of the casing J is slotted, and into it is fitted an internally-roughened spring-bar, *p*, the lower end of which is flexibly secured, as by a spring-plate, to the casing J at the lower end of the notch or slot. (See Fig. 6.)

K represents a spring, the lower end of which is secured to casing J, and the upper attached in any suitable way to the roughened bar *p*. This spring serves to press the bar *p* inward against the match to yield the necessary friction for its ignition, and at the same time yields to allow bar *p* to be drawn back far enough to yield a free passage for the match on being inserted to prepare the lighter for its work, as shown in Fig. 6.

r represents an extinguisher, consisting of a short section of a tube, which is made to surround the wick-tube, and is about the same length as that portion of the wick-tube which stands above the air-screen *s*. (See Fig. 3.) To the side of this tube is secured a bent wire rod or lever, *t*, in which is formed a short coil, through which the straight end of a hooked or bent stud, *u*, passes, the lower end of which is secured to the lamp-top. This pin forms the pivot on which the lever *t* turns. The outer end of this lever *t* then passes down through the top plate of the shell of the lamp-top, and is then again bent downward and outward, as shown in Fig. 3, to form a lever, *r'*, by which to raise the tube *r* and extinguish the flame.

P, Figs. 1, 7, and 8, represents a standard rigidly secured to the frame of the apparatus, which carries at its upper end two cam-rods, Q R.

Cam-rod Q is intended to operate on the lock-lever *q* of the lighting apparatus, forcing its upper end in, and thereby releasing the plunger *o*, which, through the action of the spring *p'*, is then driven forward, and, in so doing, ignites the match, and the latter the lamp. Cam-rod R is intended to act on the lower end of the lever *r'*, the other end, *t*, of which carries the extinguisher *r*.

Various modes of raising the extingusher may be used, as by a rigid arm moving over a stationary cam-face; or, instead of a tubular extinguisher, a hinged cap-extinguisher may be used, and operated in the same way as that illustrated for the tubular one.

In Fig. 5 is illustrated the release mechanism. S represents a time-movement, which may either be an eight-day or two-week movement.

Upon the spindle which usually carries the hour-hand is secured an eccentric, *v*, and which is arranged between two arms, *w w*, of the escapement U, which is pivoted to the frame of the clock-movement. At the side of the clock-movement thus constructed is arranged the standard B and spindle D in such manner that the teeth *x* of the release-disk G will project between the detents *y* of the escapement-lever U, as shown in Fig. 5.

Thus arranged the disk G will be provided with teeth according to the number of lamps to be used in the apparatus. As a rule, I prefer to provide it with seven lamp-burners, one for each night of the week. When thus constructed the disk G will carry fourteen teeth, and the ratchet-disk C the same number, two teeth for each twenty-four hours, for the reason that the eccentric *v* of the clock-spindle performs one revolution every twelve hours,

and therefore releases a tooth, *x*, of the disk every twelve hours, whereupon the spring F, acting on disk G, causes it to perform a part of a revolution equal to one-fourteenth of the whole, carrying with it, through the teeth *i i* on the lower end of the tube *h* of the oil-reservoir, the latter and lamps.

Now, let us suppose that the lamps are so set that the release of disk G shall take place at six o'clock in the evening and six o'clock in the morning; then the first tooth released would allow the lamps to be forced around just sufficiently far to cause the cam-rod Q to compress lever *q* of the lighting apparatus J, thereby releasing plunger *o* and match *n*, igniting the latter, and, in so doing, that lamp. Then, at the end of the next twelve hours, the next tooth of wheel G would be released, thereby causing the lamps to perform another one-fourteenth of a revolution, or just half the distance between the lamps, thereby bringing the lower end of the lever *r' t* in contact with the cam-rod R, and by this means raising the short tube *r* and extinguishing the lamp. Here the extinguisher is held until the next tooth is released and the next lamp is brought into position and lighted, and so on until the end of the week, when all have been lighted and extinguished, after which the attendant comes and removes the lamps and reservoir, and replaces it with another, or else refills and trims, and places new matches in each lighter, and then replaces it for another week's work.

W represents the handle for removing the lamps from the lantern, the top of which may be made removable for that purpose, suitable fastenings being used for keeping it in its position. Each lamp, if desired, may be provided with a separate oil-reservoir. Spring F, which moves the lamps, is wound up weekly by applying a suitable key to the top of spindle D and turning it in the proper direction, the ratchet C, arm E, and pawl *e* holding it in place when wound.

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

1. The combination of one or more lamps and intermediate mechanism, substantially as described, with a time-movement, whereby an intermittent revolving motion at regulated intervals apart is imparted to the lamp, for the purposes set forth.

2. The combination, with each of a series of lamps having an intermittent revolving motion, of an extinguishing device, substantially as set forth.

3. The combination, with each of a series of lamps having an intermittent revolving motion, of a self-lighting device, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOSEPH FORREST.

Witnesses:

D. G. STUART,

JOS. N. YOUNG.