

(No Model.)

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B. B. BUNNELL.

AUTOMATIC LAMP LIGHTER AND EXTINGUISHER.

No. 313,297.

Patented Mar. 3, 1885.

Fig 1

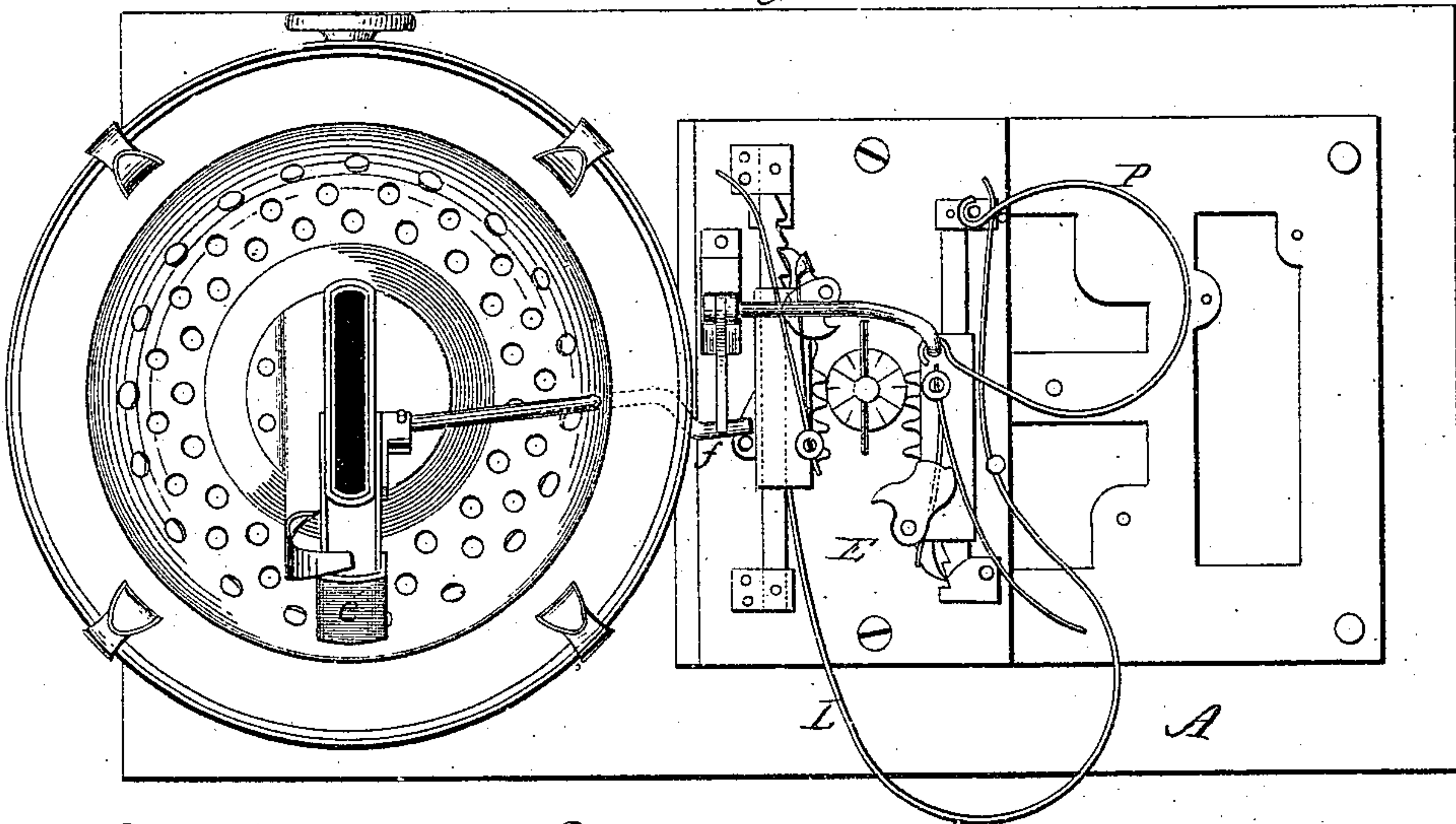


Fig 2

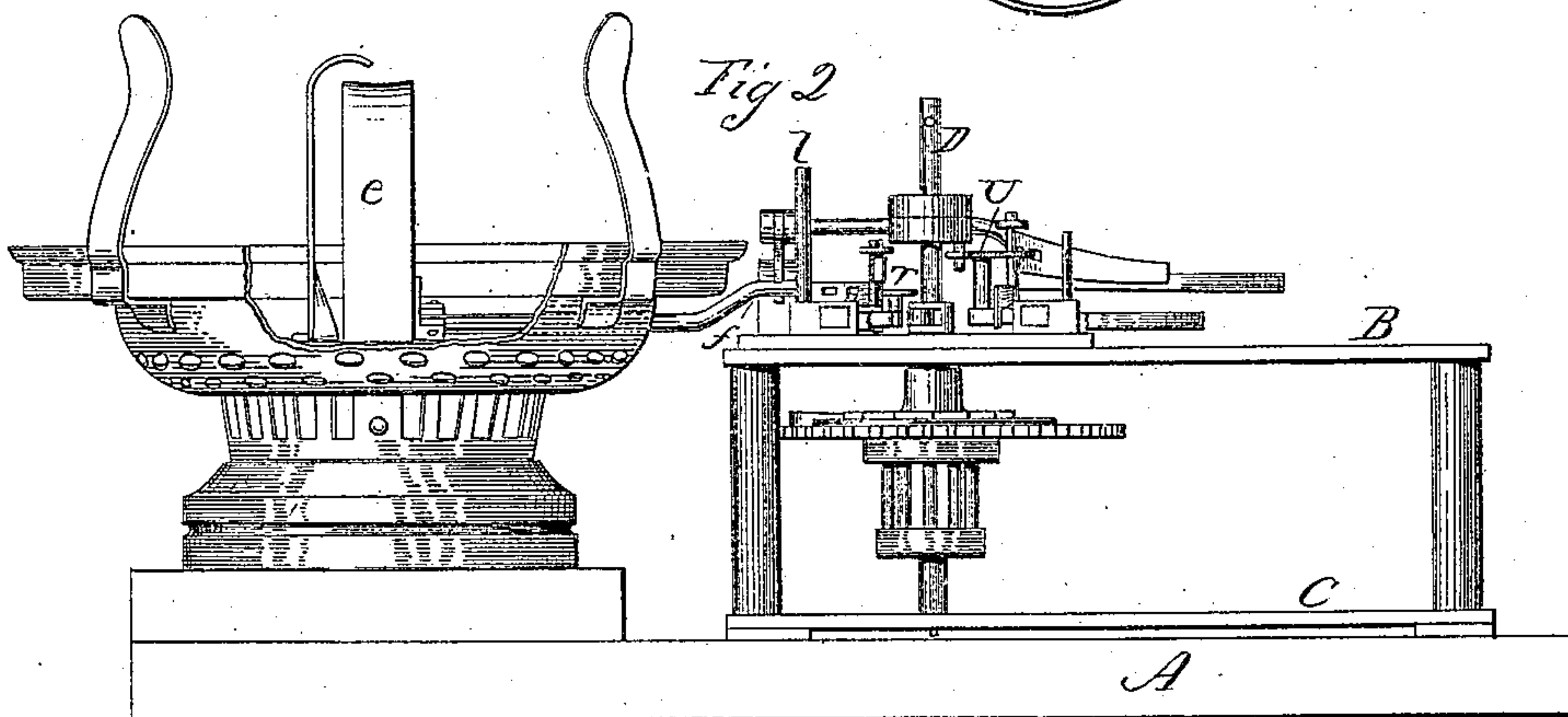
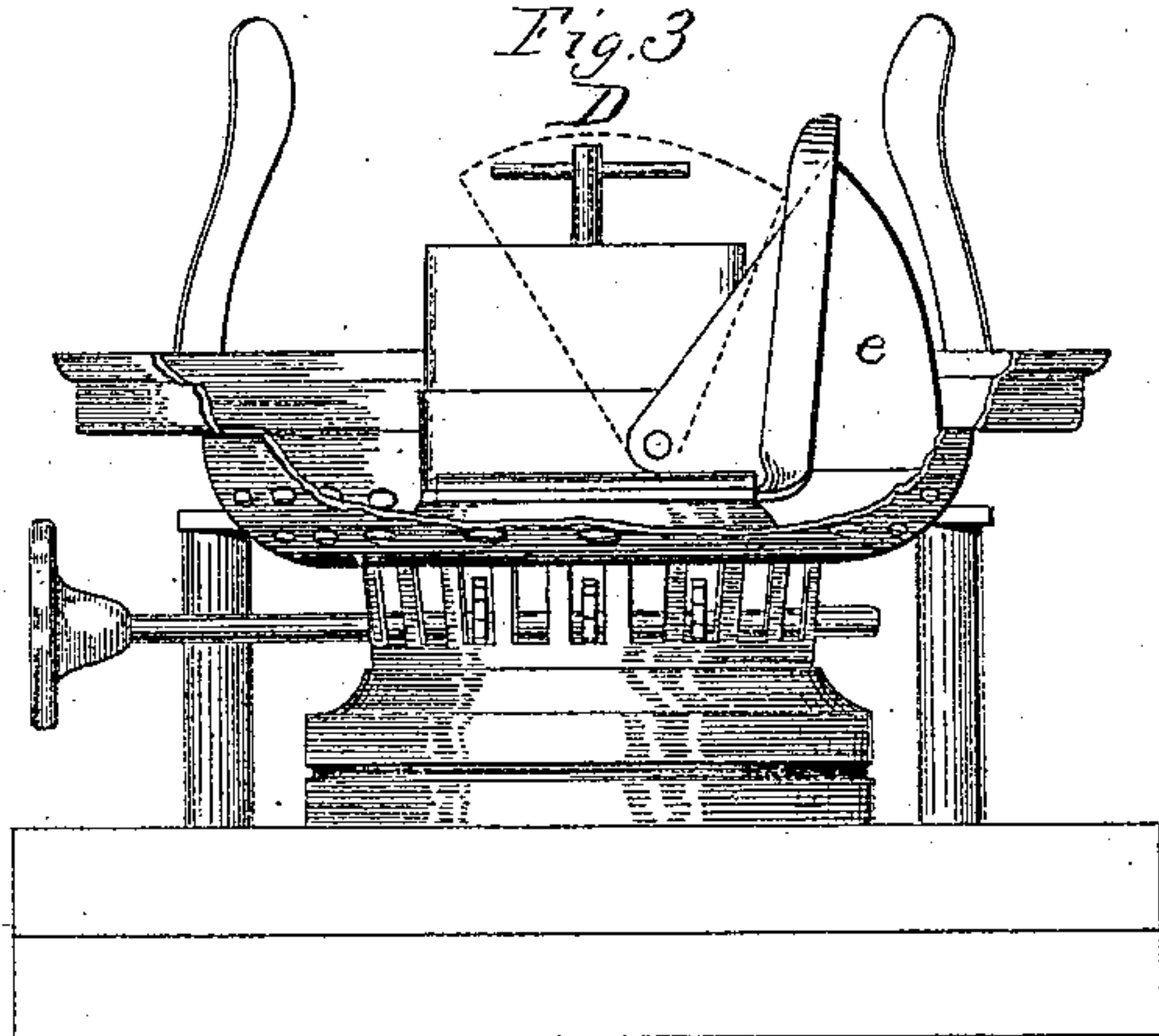


Fig 3



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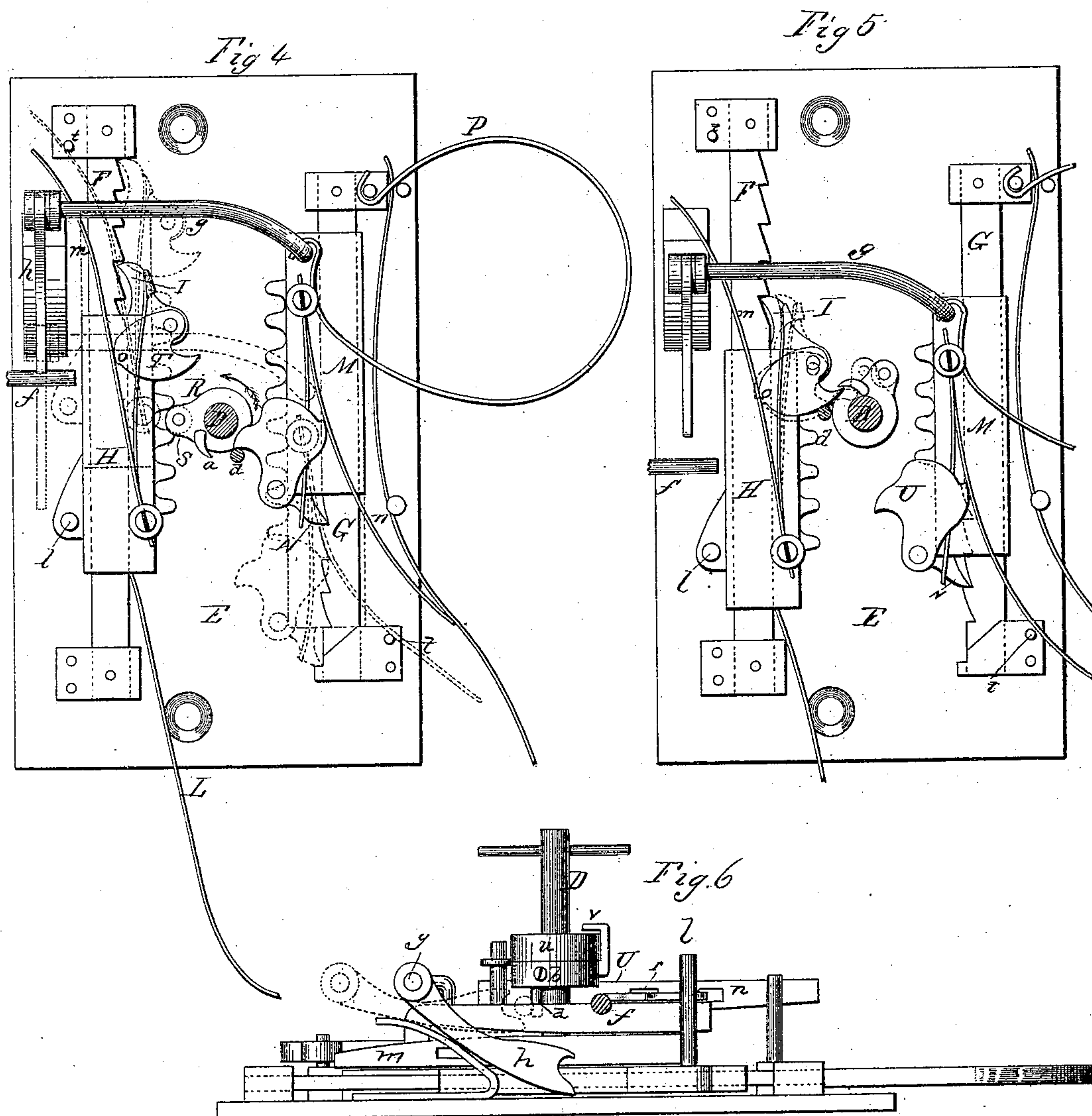
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UNITED STATES PATENT OFFICE.

BENJAMIN B. BUNNELL, OF BRANFORD, CONNECTICUT.

AUTOMATIC LAMP LIGHTER AND EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 313,297, dated March 3, 1885.

Application filed September 22, 1884. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN B. BUNNELL, of Branford, in the county of New Haven and State of Connecticut, have invented a new Improvement in Automatic Lighters and Extinguishers; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a top or plan view of the apparatus; Fig. 2, a side view of the same, portions broken away for illustration; Fig. 3, an end view looking toward the burner, portions broken away to show the extinguisher; Figs. 4 and 5, top views of the automatic mechanism, illustrating different positions; Fig. 6, a side view of the same mechanism, said figures 4, 5, and 6 enlarged.

This invention relates to a device for automatically lighting or extinguishing burners, as for street-lights, the automatic device being operated in connection with a clock-movement, whereby at a predetermined time the lighting is produced and at a predetermined time the light is extinguished. In some cases the light is a gas-fixture and in other cases a lamp; but in any case a small flame is retained constantly burning, and from which, when the gas-cock is opened, the burner is lighted, or in the case of a lamp a small constant flame is maintained and the principal portion of the flame extinguished. These devices for lighting by small flame and extinguishing the main body of the flame are common and well known, and do not require particular description, further than I shall refer to them in this specification.

The invention consists in mechanism combined with a clock-movement and a burner, as hereinafter described, and particularly recited in the claims, and whereby the object of the invention is accomplished.

A represents the base upon which the mechanism is arranged; B C, two plates of a clock-movement. The mechanism of the clock-movement may be any known clock mechanism which produces certain revolutions in certain periods of time. This mech-

anism is too well understood to require description or further illustration.

D is the second shaft, which, as here represented, revolves four times in twenty-four hours, receiving its rotation from the clock-movement.

On the plate B of the clock-movement a plate, E, is arranged to carry the special mechanism for lighting or extinguishing; and in describing this mechanism I shall refer, principally, to Figs. 4, 5, and 6, which show this plate enlarged, it being understood, however, that the plate E is not a necessary part of the mechanism, as the mechanism itself may be arranged directly upon the clock-plate and without intervention of the plate E.

On one side of the shaft D is a fixed toothed bar, F, and on the opposite side is a like toothed bar, G. The teeth on the bars are at opposite ends, the teeth of ratchet shape, the shoulder of the teeth toward the shaft D.

On the bar F is a slide, H, arranged for longitudinal movement, and carrying a spring-pawl, I, which is hinged to the slide H, and so that as the slide is moved away from the teeth of the bar the pawl will escape from one tooth to the next, and, engaging the next, will hold the slide. A suitable spring, L, is applied to the slide H, the tendency of which is to force the slide toward the shoulders of the teeth, and so that when the pawl I is mechanically raised from the bar and held the spring will force the slide to return to its extreme position. (Indicated in broken lines, Fig. 4.)

On the bar G is a like slide, M, carrying a like spring-pawl, N, which in like manner engages the teeth of the bar G, and is provided with a spring, P, the tendency of which is to return the slide M to the position seen in broken lines, Fig. 4, when the pawl shall be mechanically raised from the teeth of the bar G.

On the shaft D is an arm, R, arranged to rotate with the shaft and between the two slides H M. Each of the slides H M is provided with teeth on the side next the shaft D. The arm R carries an anti-friction roll, S, which, as the shaft R revolves, will strike between the teeth of either, as the case may be—say the slide H, as seen in Fig. 4—and as the shaft D continues its revolution will impart a

longitudinal movement to the slide H to the extent of one tooth on the bar F. Then as it arrives at the opposite side it engages the teeth on the slide M and imparts to that a like step, but in the opposite direction, to that which was imparted to the slide H. The pawl of the respective slides engages the teeth of its own bar to hold the movement thus imparted to it by the arm R, and under the revolution of the shaft. As before stated, the shaft revolves every six hours; hence at each six hours the respective slides will be moved one step, the step of one being intermediate or three hours after the step imparted to the other slide.

On the pawl I is a lever, T, above the slide, and on the pawl N is a like lever, U, above its slide; but the lever U is above the plane of the lever T, as seen in Fig. 2.

On the arm R is a shoulder or cam, *a*, which at the predetermined time will engage the lever T, as seen in Fig. 5, and as the shaft continues its rotation will turn the lever T, and with it the pawl I, to take the said pawl I out of engagement with the teeth of the bar F, as seen in broken lines, Fig. 5.

On the shaft D, and above the arm R, is a collar, *b*. Upon its under side it carries a downwardly-projecting stud, *d*, which in its path of rotation is in the plane of the lever U, and so that at a predetermined time the stud *d* will engage the lever U, as seen in Fig. 4, and so as to turn that lever, and with it the pawl N, to take the pawl from its engagement with the bar G. When either of the pawls have been thus taken from engagement with their respective bars, the slides H M are free for action of their respective springs, L P, and under the action of those springs the slides are forced to their extreme position of retreat, as indicated in broken lines, Fig. 4. Starting, then, from the extreme position of retreat, each revolution of the shaft D, or, say, every six hours, the slide H is moved one step, and at an intermediate time, and at every six hours a like step of advance is imparted to the slide M, each slide moving its step, until, finally, the respective levers will come under the influence of their respective studs or shoulders on the shaft D, when the pawls will be raised and the slides permitted to again return. Now, suppose one slide to be set so that the lever will be engaged to disengage the pawl at, say, eight o'clock at night, and the other slide be arranged so that its pawl will be disengaged at twelve o'clock. The result will be that the one slide will return to a position of retreat at eight o'clock and the other at twelve. Now, if the slide which is acted upon at eight o'clock be engaged with the burner, so as to turn on the gas or open the burner, then the lighting will occur at that time; and if the extinguisher be attached to the other slide, the light will be extinguished at twelve o'clock.

In the illustration I show the light as a common kerosene-burner provided with a com-

mon extinguisher, *e*, which is attached to a shaft which terminates in the form of a crank, *f*, near the operating mechanism, and as shown.

From the slide M an arm, *g*, extends over the bar F, and upon its end a dog, *h*, is hung. The arm *g* and the dog *h* therefore move longitudinally with the slide M. As the slide M is moved forward step by step, as before described, the dog *h* rides below the crank *f*, and as it advances and approaches its extreme advance movement the dog rides up an incline, *i*, as indicated in broken lines, Fig. 6. Then the dog, standing in that position indicated in broken lines, Fig. 6, when the slide M is released from its engagement with the bar G, retreats with the slide to the position seen in broken lines, Fig. 4, that retreat being so quick that the dog has no opportunity to fall, strikes the crank *f*, and causes its shaft to rotate and turn the extinguisher to the open position, as seen in Fig. 1, and bring the crank to the position seen in Fig. 5.

On the slide H is a stud, *l*, which stands upon the side of the crank *f* opposite to the position of the arm *g* on the slide M. From the time of the retreat of the slide M, and after thus opening the burner, the slide M will be again advanced step by step, the slide H continuing its like advance and until its pawl is released from the bar F. Then, under the reaction of its spring L, the slide H will be thrown to its position of retreat, as seen in Fig. 4. The stud *l* on the said slide H in such movement strikes the crank *f* and throws it from the position seen in Fig. 5 to that seen in Fig. 4, returning the shaft and extinguisher to the position indicated in broken lines, Fig. 3, and so that the extinguisher partially covers the upper end of the wick, and the light is practically extinguished.

As before stated, the relative positions of the slides to the shaft being such that the extinguisher will be open at eight o'clock and closed at twelve o'clock, it follows that at those times in each twenty-four hours the extinguisher will be opened and closed.

The extinguisher, it will be observed, does not quite cover the end of the wick, but leaves a portion at one edge open sufficient to maintain a small flame, from which, when the extinguisher is open, the whole wick will be ignited—a common and well-known device.

Each tooth on the slides represents three hours. A change of one tooth on one slide will therefore make a variation of six hours—that is to say, supposing the relation to be such that four hours elapses between the opening and closing of the extinguisher. If the opening-slide be advanced one tooth—that is, be moved upon its bar one tooth independent of the rotation of the shaft—the opening of the burner will occur three hours earlier; or, moved in the direction of retreat, will occur three hours later, and a like adjustment upon the slide H will make a corresponding three hours' variation in closing.

In order that a variation of less than six hours may be made, I make the collar *b* on the shaft *D* adjustable. It will be remembered that the collar *b* carries the stud *d*, which actuates the slide *M* to produce the opening of the burner. Now, if the collar *b* be turned upon the shaft *D* to change the position of the stud *d*, a corresponding change in the time of action upon the lever *U* will be made—that is to say, if the stud *d* be advanced, then the action upon the lever *U* and the release of the slide *M* will be earlier. If it be turned in the opposite direction, then that action will be later. (The direction of advance of the shaft *D* is indicated by the arrow in Fig. 4.) The stud *d* being adjustable, the stud *S*, which actuates the slide *H*, may remain constant, and if a change of time for the action of that slide be required the clock-movement may be adjusted accordingly—that is to say, if the clock be set on true time and the extinguishment is required an hour earlier, then the clock will be advanced an hour, or vice versa. It is therefore necessary only that one of the actuating studs shall be adjustable, and this I prefer to make for the opening or lighting slide, as in the ordinary street-lighting the extinguishment is constant, and the lighting only requires adjustment.

The collar *b* is made adjustable by a set-screw, as seen in Fig. 6. By loosening that screw the collar may be turned to any desired position and reset.

To hold the pawls out of possible engagement with the teeth of their respective bars when on the retreat, I arrange a flat spring, *m*, for the lever *T*, and a like spring, *n*, for the lever *U*, and arranged to bear upon the back of their respective levers. Each of the levers is constructed with a shoulder, *o*, and which, when the lever—say *T*—is turned into the position indicated in broken lines, Fig. 5, will engage a hole, *r*, in its spring, and the spring will thus prevent the lever returning under the action of its spring, and will hold the pawl out of engagement with the teeth until, as the slide reaches its extreme position of retreat, the free end of the spring will strike a stud, *t*, and cause the spring to turn away from its engagement with the lever *T*, and, as indicated in broken lines, so as to release the lever and permit the pawl to again fall into engagement with the bar *F*. The spring *n* of the lever *U* engages its shoulder in like manner, and then on its retreat strikes the stud *t*, which turns the spring out of engagement with the lever, and so as to permit the pawl to re-engage the bar *G*, and as indicated in broken lines, Fig. 4.

For convenience of setting the collar *b*, a second like collar, *u*, is fixed to the shaft above the collar *b*, as seen in Fig. 6. The upper face of this collar is graduated, say, into twelve divisions, as seen in Fig. 1, each division indicating one-half hour, and from the adjustable collar *b* a pointer, *v*, extends up over onto the face of the collar *u*, and by which the re-

quired movement of the adjustable collar may be indicated, each of the divisions indicating a half-hour earlier or later, according to the direction in which it is turned.

The illustration of the invention as applied to turning the extinguisher on a lamp-burner will be sufficient to enable those skilled in the art to understand its application to a gas-cock, the crank being applied to the gas-cock, to turn the cock in like manner as it turns the extinguisher.

While I have represented the shaft *D* as revolving four times in twenty-four hours, it will be readily understood that the actuating-arm may be applied to a shaft having a different number of revolutions, it only being essential, in order to operating once in twenty-four hours, that the step-by-step movement of the slides shall be completed at predetermined times once in twenty-four hours.

I claim—

1. The combination of a clock-movement, a pair of fixed parallel toothed bars, *F G*, one arranged each side the shaft *D*, the slides *H M*, arranged, respectively, on said toothed bars, their adjacent faces provided with teeth, the spring-pawls *I N*, hung, respectively, to the said slides, the said pawls carrying, respectively, levers *T U*, the shaft *D*, the arm *R*, arranged thereon, and so as to revolve between said slides and to engage the teeth of the respective slides at each revolution, the crank *f*, extending from the shaft of the burner, one of said slides carrying a dog and the other a shoulder or stud in the path of said crank, the shaft *D*, provided with studs to engage the said levers *T U* at predetermined times and release the said slides from their pawl engagement with the respective bars, and springs arranged to return said slides, substantially as described, and whereby under the return of the respective slides and at predetermined times one will produce the lighting and the other extinguish the light.

2. The combination of a clock-movement, the parallel fixed toothed bars *F G*, toothed slides *H M* on said bars, pawls *I N*, hung to the respective slides, levers *T U*, attached to said pawls, the shaft *D* of the clock-movement, carrying an arm, *R*, between and so as to engage with the teeth of the said slides, the said shaft provided with studs *a d*, to respectively engage the said levers *T U* at predetermined times, each of said levers constructed with a shoulder, *o*, and provided with a spring, *m*, to engage said shoulders, fixed studs *t*, to trip said springs and release said levers, a burner to which a crank, *f*, is fixed, dog *h* on one of said slides, and a stud, *l*, on the other, and springs to return said slides, substantially as and for the purpose described.

3. The combination of a clock-movement, the shaft *D*, arranged to receive rotation from said movement, the parallel fixed toothed bars *F G*, the toothed slides *H M*, respect-

ively on said bars, the pawls I N, hung to
the respective slides, the levers T U, fixed to
the respective pawls, an arm, R, on said shaft,
and arranged to work in the teeth of the re-
5 spective slides, whereby a step-by-step move-
ment will be imparted to said slides, a fixed
shoulder, *a*, arranged to trip one of said le-
vers, and an adjustable stud, *d*, on the shaft,
arranged to trip the other lever, the dog *h* on

one of said slides, and stud *l* on the other, a ro-
tary burner having a crank, *f*, extending there-
from, and springs to return said slides, sub-
stantially as and for the purpose described.

BENJAMIN B. BUNNELL.

Witnesses:

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EGBERT E. BISHOP.