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H. S. RICHARDSON.

Automatic Machine for Lighting and Extinguishing Gas.

No. 55,909. Patented June 26, 1866.

Fig. 1

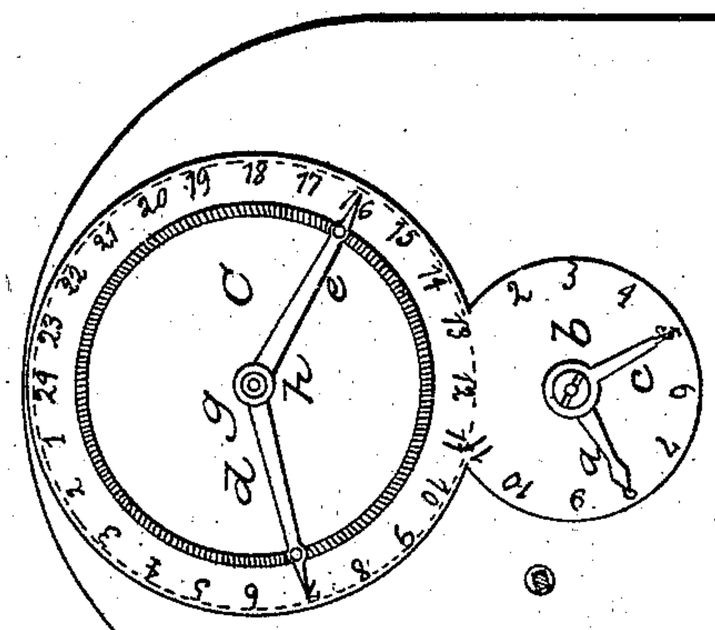
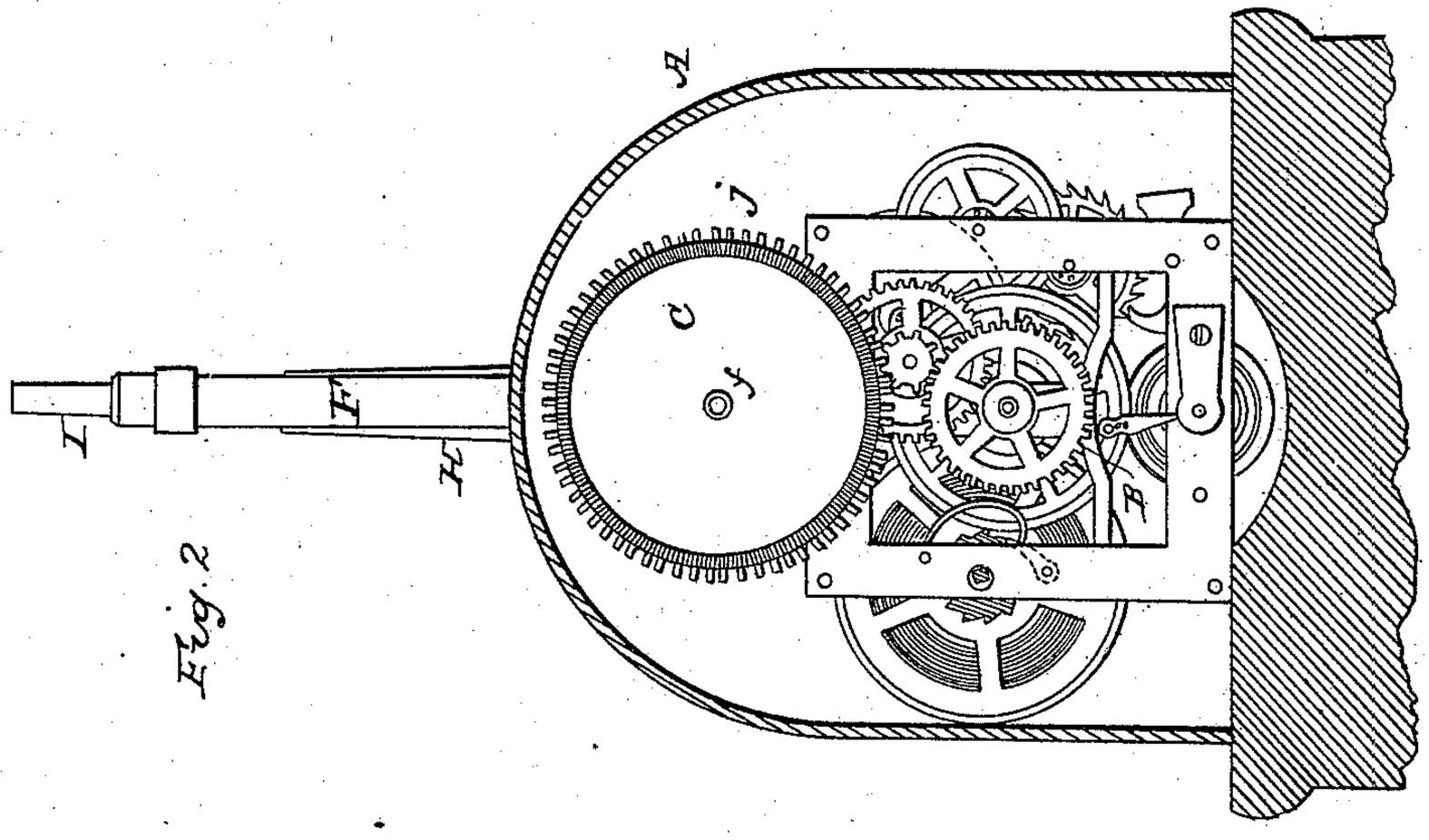


Fig. 2



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2 Sheets—Sheet 2.

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Fig. 4

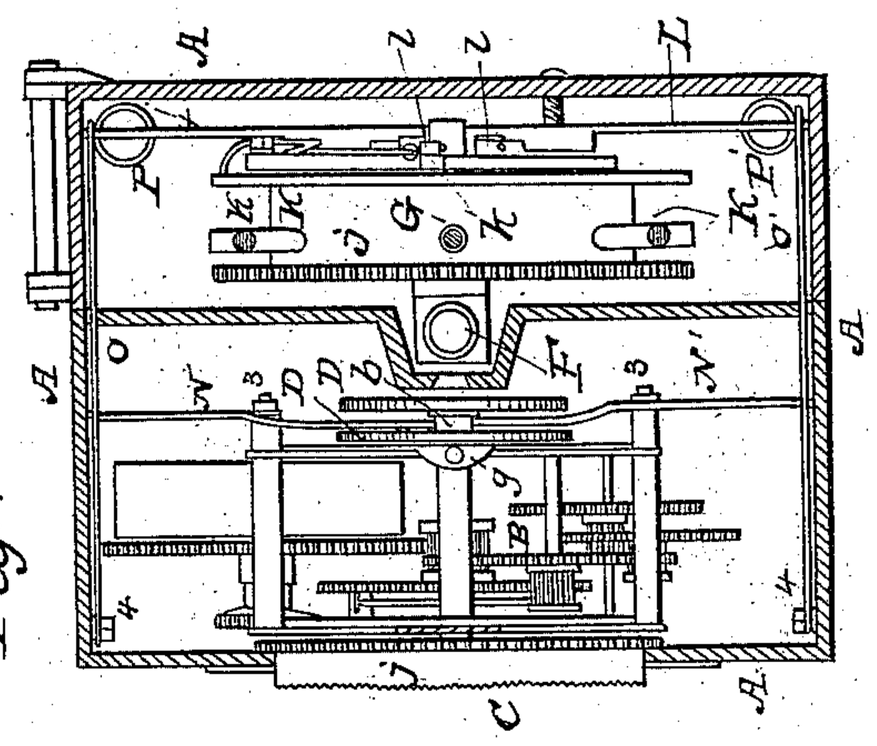
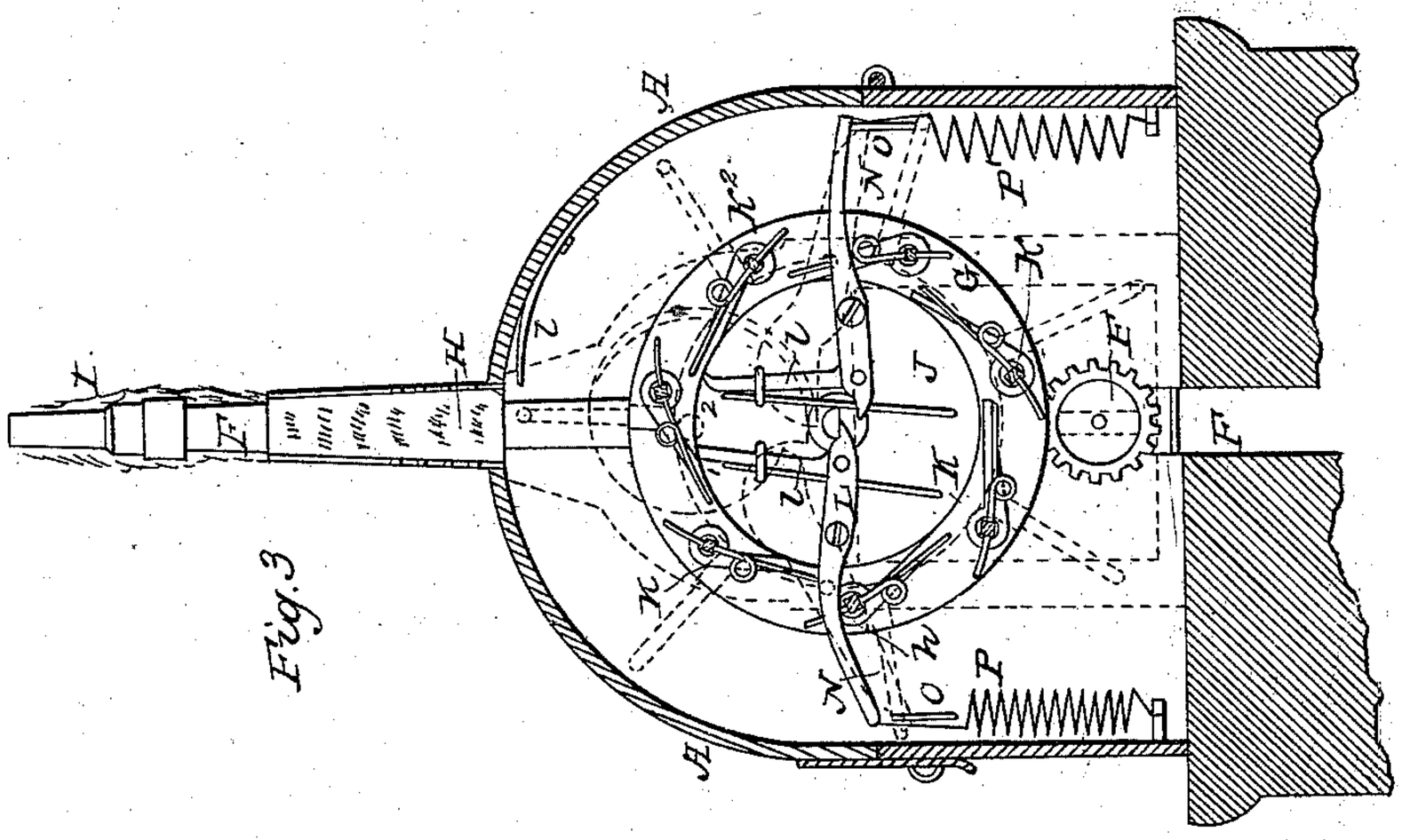


Fig. 3



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UNITED STATES PATENT OFFICE.

H. STONE RICHARDSON, OF MANLIUS, NEW YORK, ASSIGNOR TO HIMSELF AND E. P. RUSSELL, OF SAME PLACE.

IMPROVEMENT IN AUTOMATIC MACHINES FOR LIGHTING AND EXTINGUISHING GAS.

Specification forming part of Letters Patent No. **55,909**, dated June 26, 1866.

To all whom it may concern:

Be it known that I, H. STONE RICHARDSON, of Manlius, in Onondaga county, in the State of New York, have invented a new and useful Machine for Automatically Lighting and Extinguishing Gas or other Lights; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference thereon marked.

The nature of my invention principally consists in combining a suitable time-keeping device with a suitable device for turning a gas or other cock, so that the machine may automatically turn the gas on or off at any hour to which it may be set, all of which will more fully hereinafter appear.

To enable others to make and use my invention, I will describe its construction and operation.

In the drawings, Figure 1 is a front elevation, showing the time-dial and the setting-dial. Fig. 2 is a front elevation, with the face of the case removed, so as to show the arrangement of the clock-work device and its connection with the setting-wheel. Fig. 3 is a rear elevation, with the rear of the case removed so as to show the mechanism for operating the gas-cock. Fig. 4 is a plan view, the case being in section, showing the connection between the clock-work device and the turning device.

My invention is more particularly intended to be used for lighting and extinguishing street gas-lights, but is, of course, applicable to other purposes.

In the drawings, A represents a cast or stamped metal case, in which the machine is placed, and it serves as the outer frame-work, to which some of the parts are fixed.

B represents the common clock-work of an eight-day spring-clock, and it is duly provided with a time-dial, *b*, and hour and minute hands *a* and *c*, for showing the hour, and communicates motion to the setting-wheel.

C is the setting-wheel provided with hands *d* and *e*, for respectively setting the hours at which the gas is to be turned on and off. This wheel is provided with a hollow spindle, *f*, within which turns the cam-shaft *g*, within which is the shaft *h* of the other cam.

D and D′ are the cams on shafts *g* and *h*, and they alternately turn the gas on or off.

F F′ is the gas pipe and cock, the cock being so constructed that when turned on another quarter-turn in the same direction will turn it off. This cock is provided with a small cog-wheel, *i*, actuated by a larger wheel, *j*, forming the front plate of the lighter-barrel. These two wheels *i* and *j* are so proportioned and geared that one-seventh of a revolution of the larger wheel shall produce one-fourth of a revolution of the smaller one.

G is the lighter-barrel or match-cylinder, and it is made to revolve by a suitable coiled spring, S, contained within the cylinder. It is also provided with seven match-tubes, *k*, into which suitable "squib" for other matches are to be placed. A friction-slip, *l*, is placed near the opening of the draft-tube H, so as to draw the flame up to the burner I.

J is a stationary plate forming the rear end of the match-cylinder, and is provided with two detent-teeth, 1 and 2, being far enough apart to allow the revolving cylinder G to make one-seventh of a revolution whenever both detents have let go their hold.

K are seven dogs pivoted at the margin of the match-cylinder G, and in turn catch against the teeth 1 and 2. The dog K′ escapes from tooth 1 at the instant that the match is lighted and the gas is turned on, as shown in Fig. 3. At the same time dog K^2 catches against the tooth 2 and detains the match-cylinder until the time arrives for extinguishing the light.

L L′ are the two operating dog-levers, each being pivoted to the plate J, and provided with tripping-levers *l l′* for tripping the dogs K.

D D′ are two cams, respectively fast to their shafts *g* and *h*, by which the cams are revolved.

N N′ are two cam-levers, pivoted at the studs 3 3 and operated by the cams M M′.

O O′ are two connecting-levers, having one end pivoted at studs 4 4 and the other resting under the end of dog-levers L. The end of cam-lever N rests under the center of connecting-lever O and causes it to elevate the outer end of dog-lever L.

P P′ are spiral springs, whose office is to pull down the ends of the dog-levers the instant that they are set free from the elevating power of the cams and cam-levers.

The operation of my invention is as simple

as effective. The clock being wound and the match-cylinder being provided with seven matches and duly wound, the machine is ready for automatic operation for seven days. After the expiration of this time the machine is again wound and resupplied with matches. The cams and other machinery should be so adjusted, for instance, that when the on-hand *d* indicates 24 the gas shall be turned on and lighted, and when the off-hand *e* reaches the same 24 the gas shall be turned off and extinguished. Suppose, then, that we wish to light the gas at 7 o'clock in the evening, we fix the on-hand *d* at 7 at the same time that the time-dial indicates 12 o'clock, m. The time-hands and setting-hands will move together at the same rate for seven hours, or until 7 p. m., at which time the hand *d* will reach the 24, and the proper mechanism will turn on and light the gas. If it is desired to turn off the gas at 4 o'clock in the morning, the off-hand *e* is set at 16, or the number (9) of hours behind the on-hand that it is intended the gas shall burn. When the off-hand *e* gets to 24 the on-hand *d* will have reached 17, and at the instant that the hand *e* reaches 24 it will cause the appropriate mechanism to turn off and extinguish the gas.

Fig. 3 shows the attitude of the machine in the act of lighting the gas, the gas having just been turned on and the match ignited.

As the setting-wheel C revolves (being driven by wheel Z of the clock-work) it revolves its two shafts *g* and *h*, which are made fast with it, by means of hands *d* and *e*, and they turn their two cams D D′. Cam D presses down the inner end of cam-lever N, so as to prevent it from tripping dog K′ until the set time. As soon as the set time comes, and just as the cam-lever escapes from the highest to the lowest point of the cam, the cam-lever releases the connecting-lever O, and thus permits the spring P to instantly depress the outer end of dog-lever L, which raises its inner end and its tripping-lever *l* so as to disengage the dog K′ from the tooth 1. The very instant this is done the match-cylinder G makes one-fourteenth of a revolution, and by means of cog-wheels *i* and *j* gives a quarter-turn to the cock and lets on the gas. At the same instant the match contained in match-tube *k′* is ignited and its flame thrown up draft-chimney H, and comes in contact with the flame and lights the gas. When the dog K′ has thus escaped from tooth 1 dog K^2 is stopped by tooth 2, where it is held until the set time has arrived for turning off the gas. When this time comes cam D′ releases cam-lever N′, which releases connecting-lever O′, thus permitting spring P′ to depress lever L, and thereby make the tripping-lever *l* disengage the dog K^2. As soon as this is done the cylinder G makes a fourteenth of a revolution, and through cogs *i* and *j* gives a quarter-turn to the gas-cock, thus turning off the gas and extinguishing the light. The mechanism will all then remain inactive, except the clock-work, until 7 o'clock, p. m., of the next day, when the same process will be repeated, and in like manner the machinery will continue to light and extinguish the gas for seven nights. The machine will then be rewound and be supplied with more matches.

The time-dial will at all times serve to indicate the time.

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

1. The setting-wheel C, in combination with the hands *d* and *e*, shafts *g* and *h*, and cams D D′, substantially as and for the purposes set forth.

2. The match-cylinder G, constructed and operating substantially as and for the purposes set forth.

3. The dogs K, K′, and K^2, in combination with cylinder G and plate J, substantially as and for the purposes set forth.

4. The cams D D′, cam-levers N N′, connecting-levers O O′, dog-levers L L′, and springs P P′, constructed and arranged substantially as and for the purposes set forth.

5. The setting-wheel C, provided with cog-wheel *j*, when so combined with cock cog-wheel *i* as to alternately turn the gas on or off, substantially as herein set forth and described.

6. The draft-pipe H, operating substantially as described, and in combination with the match-tubes *k*.

In testimony that I claim the above I hereunto set my hand.

H. STONE RICHARDSON.

Witnesses:
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M. A. BAKER.