

S. GARDINER, Jr.
Electric Gas Lighter and Extinguisher.

No. 57,697.

Patented Sept. 4, 1866.

Fig. 1.

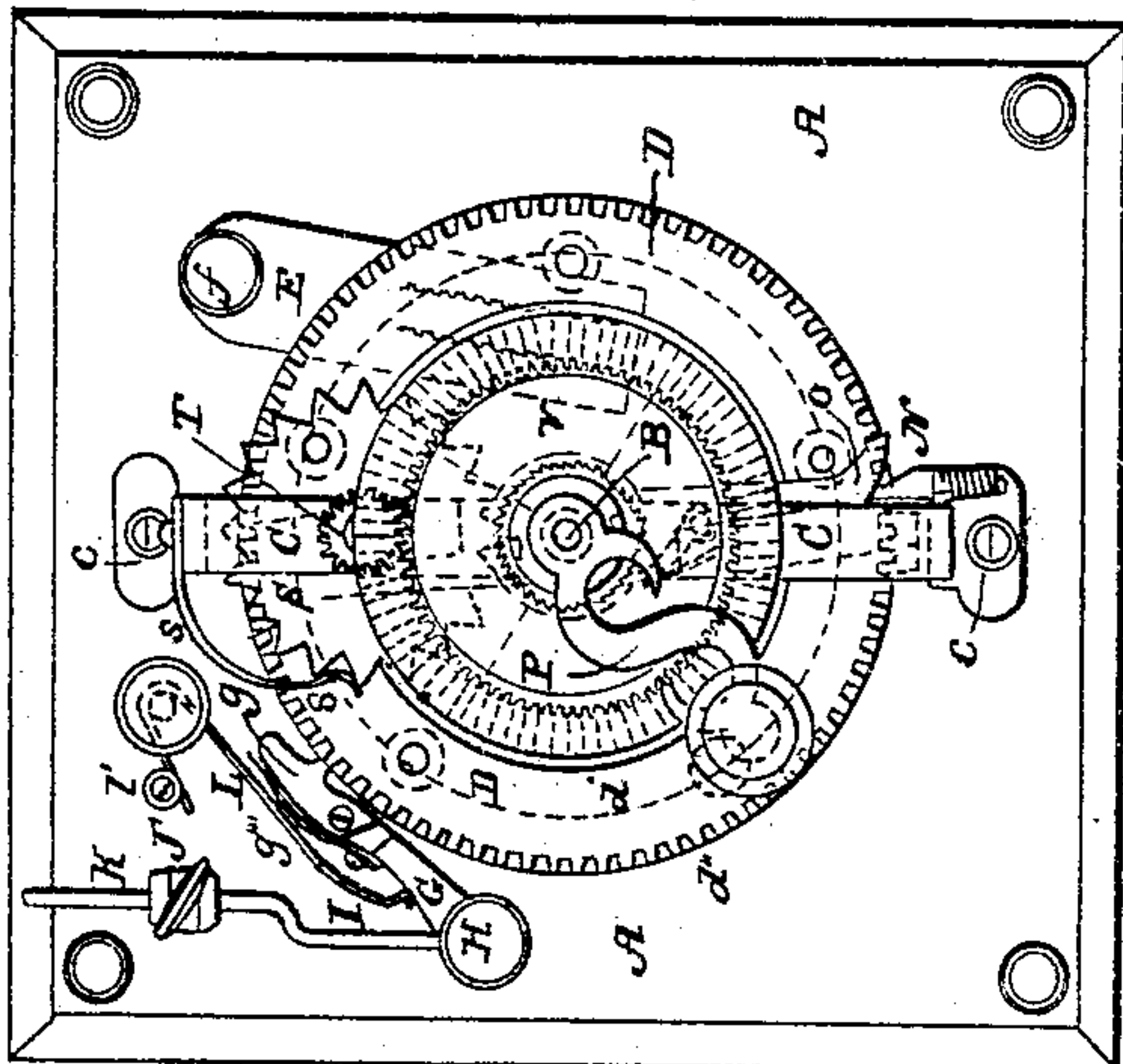


Fig. 2.

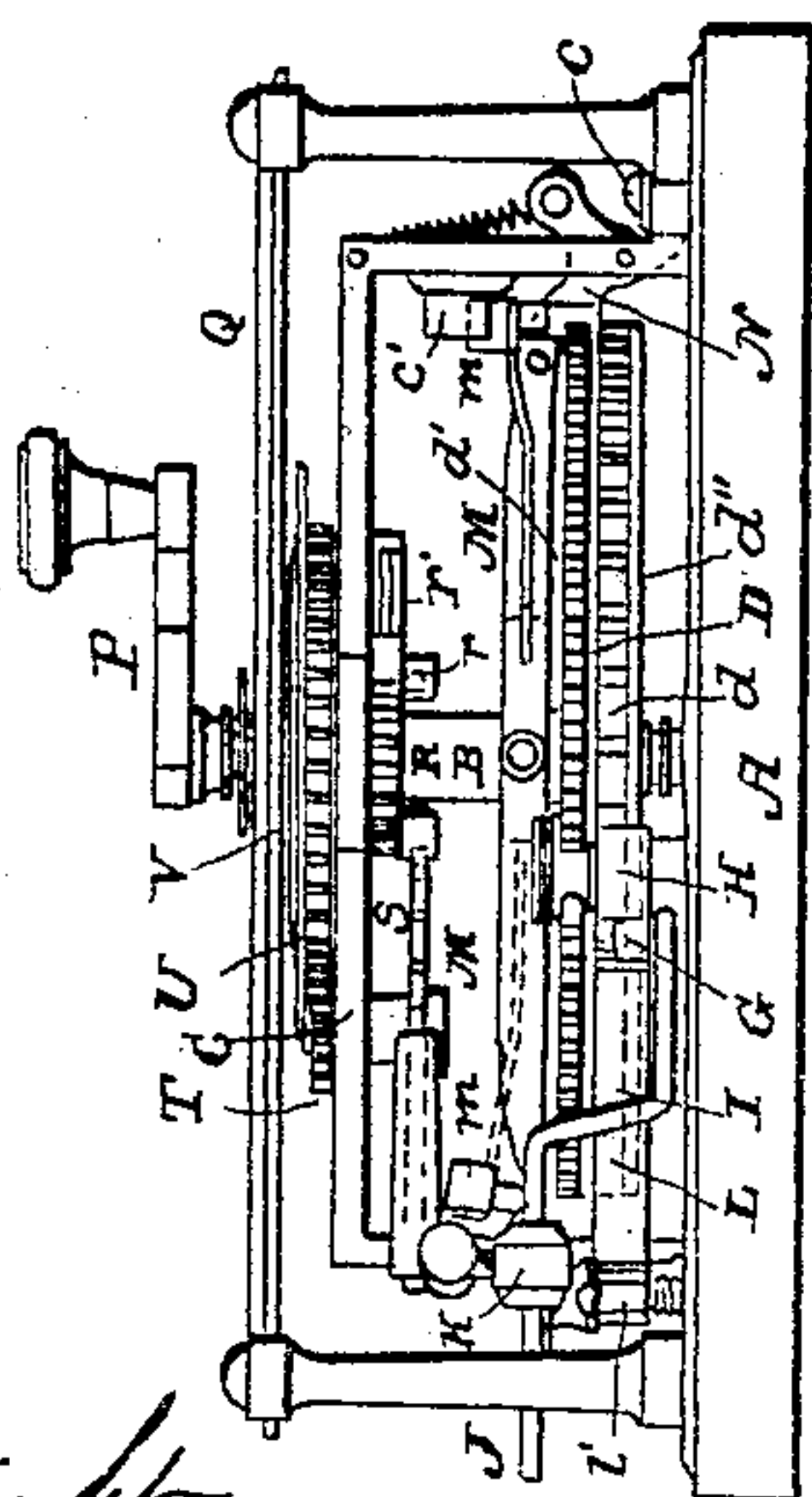


Fig. 3.

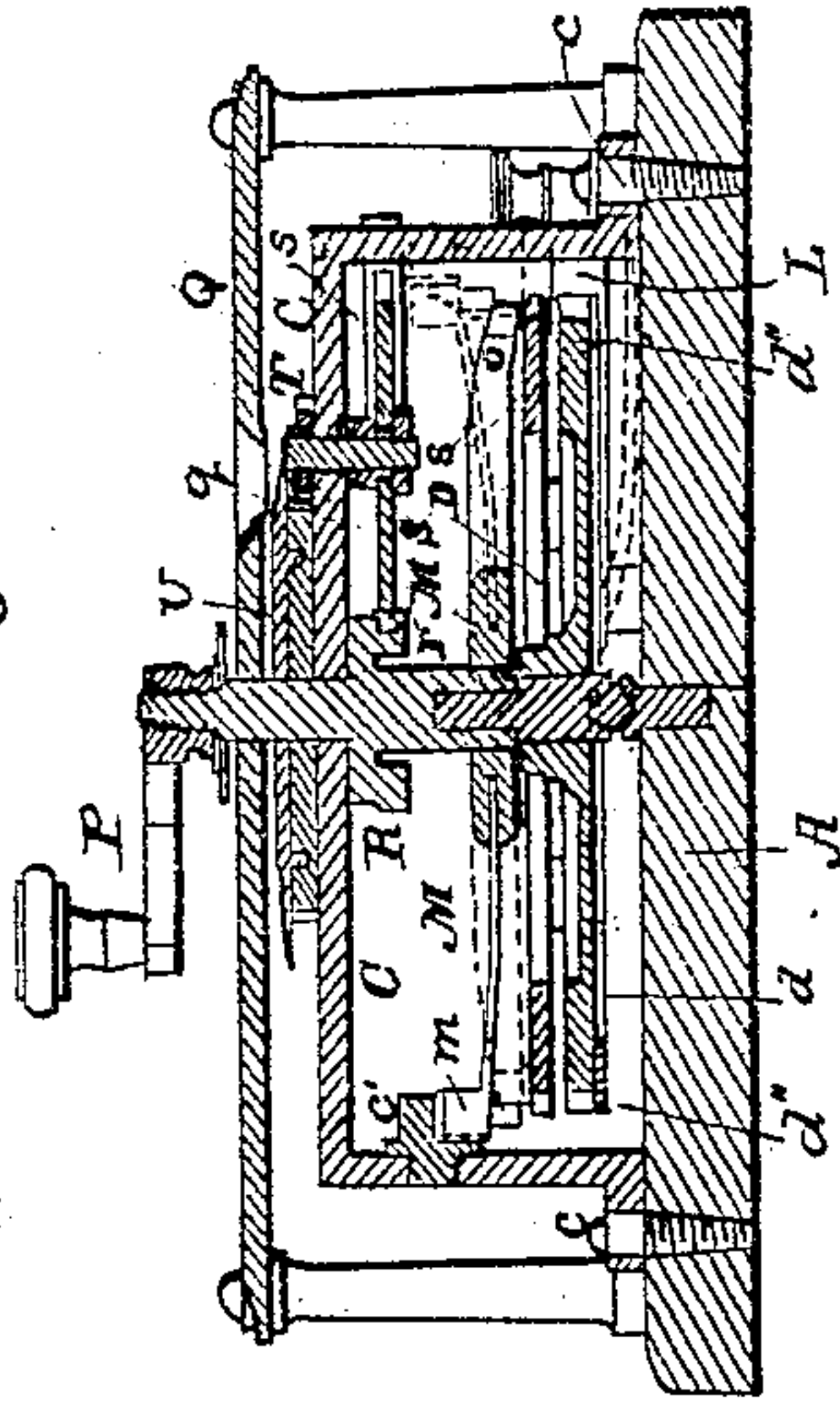


Fig. 4.

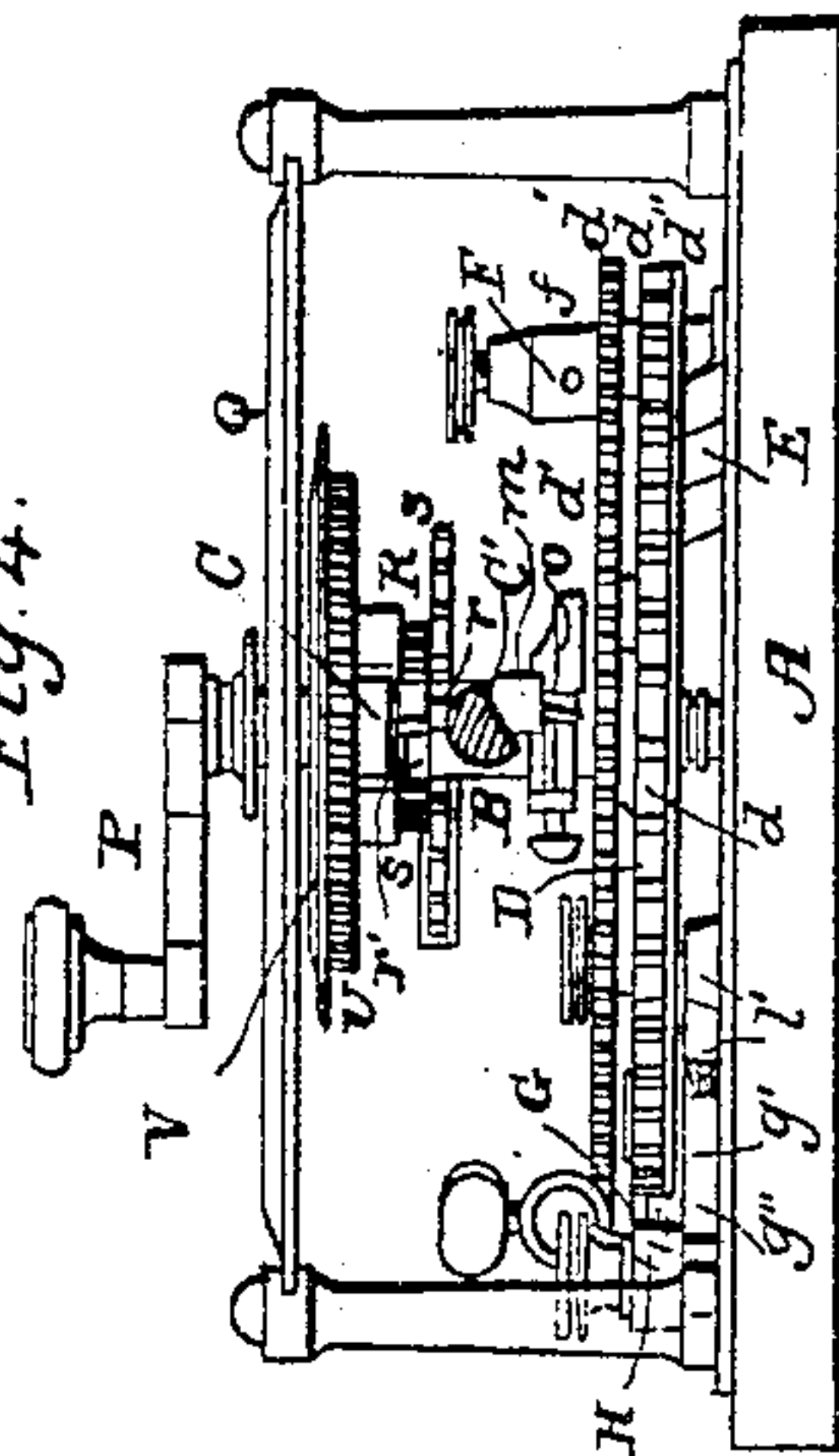
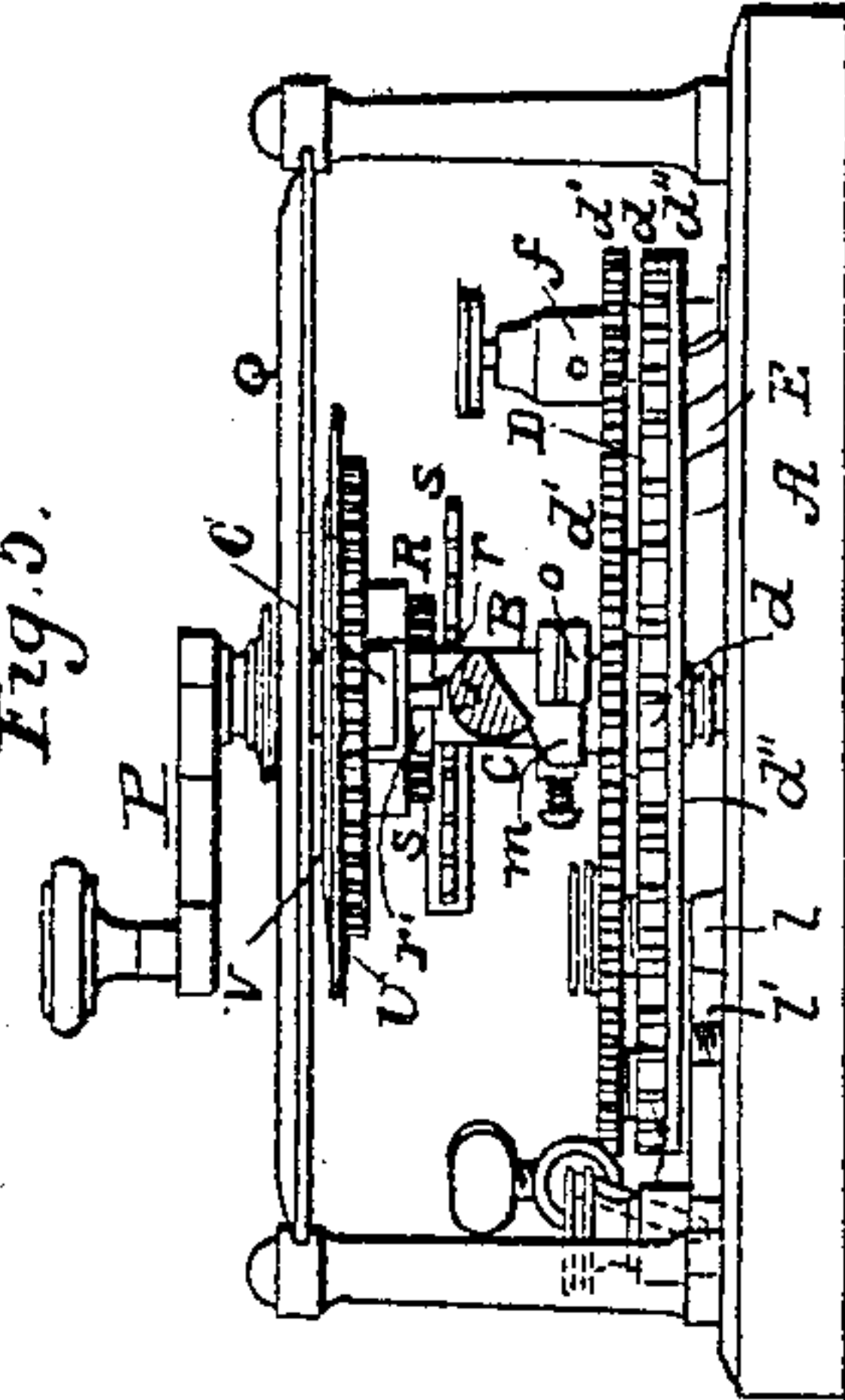


Fig. 5.



Witnesses:
Edward H. Knight
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UNITED STATES PATENT OFFICE

SAMUEL GARDINER, JR., OF NEW YORK, N. Y.

IMPROVEMENT IN TURNING ON AND SHUTTING OFF GAS BY ELECTRICITY.

Specification forming part of Letters Patent No. 57,697, dated September 4, 1866.

To all whom it may concern:

Be it known that I, SAMUEL GARDINER, JR., of the city, county, and State of New York, have made a useful Apparatus for Turning Gas On and Off by Electricity; and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of the same, sufficient to enable one skilled in the art to which it is allied to construct and use the same, reference being had to the accompanying drawings, which are made part of this specification, and in which the same letters refer to corresponding parts in the different figures.

Figure 1 is a face view or elevation. Fig. 2 is a side elevation. Fig. 3 is a vertical central section. Figs. 4 and 5 are two elevations from the same point of view, but showing different portions of the arm *m*, which rotates the main wheel.

The improvement consists of an apparatus for working an electro-magnetic engine, which operates the stop-cock of a gas-main to turn the gas on and off.

The apparatus consists of a wheel connected with one pole of a battery and provided with alternate conducting and non-conducting points, which are rotated in contact with the other pole of the battery, so as to give intermittent pulsations to the armature of an electro-magnetic machine placed in the circuit and operating a ratchet-wheel on the axis of the stop-cock which controls the flow of gas in the main.

In connection with the wheel is a crank, by which it is revolved, and verniers, which indicate the position of the wheel, which bears a certain correspondence with that of the stop-cock.

The special devices for communicating and registering the motions derived from the key will be hereinafter described at length.

In the drawings, A is the board or backing, to which the apparatus is suitably attached, as by the bearing of the central shaft, B, and the screws *c c* in the flanges of the bridge-piece C, in which the shaft B is journaled. Loose upon the latter is the wheel D, which consists of three portions, *d d' d''*. The first is of brass, and rotates in constant connection with the spring-plate E, which is connected with one pole of the battery—say, the south-pole wire, F, which passes through the binding-post *f*. The periphery of the portion *d* of the wheel is divided into forty cogs, with

intervals twice as wide as the width of the cogs, and to it the portion *d'* is secured, having on its periphery twice the number or eighty cogs, the alternate cogs agreeing with those on the periphery of the first-mentioned wheel *d*, as shown in the elevation, Fig. 2.

The remaining portion, *d''*, of the wheel consists of a ring of hard rubber or other non-conducting material, whose edge comes out even with the face of the teeth on the wheel *d*.

In contact with the revolving edge of the wheel D thus constituted is a spring-key, G, part of which is in constant contact with the hard-rubber ring *d''*, and another part of which is in occasional contact with the cogs of the portion *d*. The key G is pivoted to a post, H, to which the wire I is attached, and which wire is connected in the binding-key J with the wire K—say, the north-pole wire of the battery.

Between the binding-key J and the battery is placed an electro-magnetic engine—not here shown, but the subject of Letters Patent granted to me the 19th day of June, 1866.

The armature of this engine, I may here say, is caused by its reciprocating motion under the alternate electric connection and disconnection to rotate a ratchet-wheel affixed to the axis of a stop-cock, so as to rotate it and consequently shut off or turn on the gas, the purpose of the engine, as the purpose of the apparatus the subject of this specification, is to work the engine and keep the register of its movements, so that the position of the stop-cock shall be clearly indicated to the eye at the perhaps distant point where the operator is placed.

The key G is kept in contact with the wheel D by means of the spring L, whose position is secured by the posts *l l'*. As a portion of the key G are two or three plates, *g g' g''*, which are pivoted to G and are pressed by the springs *g'''* against the cogs of the portion *d* of the wheel D as the said cogs arrive opposite to the protuberances on the plates *g g' g''* and make the electric connection.

The wheel D is revolved by means of the arms M on the central shaft, B, the spring-teeth engaging with the teeth on the periphery of *d'* as the tooth is pressed down for that purpose by the stud *c'* on the inside of the bridge-post C'.

The tooth *m* is attached to a spring-plate, *m'*, and the latter to the arm M.

A spring-detent, N, on the bridge-post en-

gages with the teeth in the wheel d' and prevents its revolution until withdrawn by the arm O, which follows in the rear of M, and detaches the detent as the tooth m engages with the tooth to rotate the wheel one notch. This accomplished, the detent engages the next tooth, and the spring-tooth, no longer held down by the stud c' , flies up from engagement with the wheel d' .

The wheel D is revolved one cog of d by two consecutive impulses of the arms M M, produced by one revolution of the crank P. One of the impulses places the key G g out of electric connection, and the other impulse places it in connection or conversely.

The parts and motions already described have reference to that portion of the apparatus by which the wheel D is revolved to make and break the electric connection and obtain the intermittent motions of the armature of the electro-magnetic engine which operates the stop-cock of the gas-main.

I now proceed to describe that portion of the apparatus by which the motions of the wheel D are registered or indicated on or through the dial-plate Q.

On the central shaft, B, is a ratchet-wheel, R, which is revolved by the motions of the shaft in one direction, the reverse motion being prevented by the spring-pawl r' .

On the wheel R are two studs, $r r$, which, as the shaft is rotated, engage with the teeth of the wheel S, which revolves by the said impact one tooth at a time, the detent-spring s acting as a pawl.

Upon the shaft s' of the wheel S is a pinion, T, which engages with the spur-wheel U, which runs freely upon the central shaft, B. To the face of the wheel U is attached a dial, V, whose face is divided into four sectors of ninety degrees each, two being dark and two light, and alternating in the circle. The sectors are subdivided into ten equal parts on the margin of the dial by the interposition of stripes of white in the black sector and of black stripes in the white sector, a band of black and white being counted as one part, and the number of parts agreeing with the number of the cogs in the portion d of the wheel D—namely, forty.

The dial-plate Q has an orifice, q , through which a portion of the dial V is discovered, a central point or line vertically above the shaft agreeing with the middle of the arc. If the dial-plate Q be made of glass, the hole may be dispensed with, and a zero or central point may be marked on or attached to the glass or behind it.

When adjusting the position of the various parts a certain correspondence must be attained between the crank P and the wheel D, so that when the crank is turned down the key G g shall be in contact with the non-conductor d'' , as by this means it will be always apparent to the operator whether the electric connection is or is not existing.

I have already spoken of a correspondence between the position of the dial V and the stop-cock which controls the gas-main. This apparatus must be so adjusted that the middle of the dark portion or portions of the dial V shall be at the zero or some special initial mark or point of departure—say, for instance, the middle of the opening in the dial-plate, when the stop-cock is accurately closed, the corresponding middle point of the light portion of the dial V being at the said zero on the dial-plate when the stop-cock of the gas-main is fully open. Under this adjustment the condition of the stop-cock will always be indicated by the position of the dial, whether the stop-cock be open, closed, or in positions between the two.

The dial-plate as constructed moves in equal times with the wheel D, and the series of studs and gears intervening between the two are, of course, calculated and adjusted for this result; but the only necessary correspondence is that of the dial and the stop-cock.

The agreement of the non-closure of the electric with the downward position of the crank P is a convenient adjustment.

What I claim as new, and desire to secure by Letters Patent, is—

1. The wheel D, provided with the non-conducting and conducting surfaces, substantially as described, and rotated by a crank whose revolutions are registered by or upon a dial, substantially in the manner and for the purpose described.

2. The dial, with its light and dark segments or portions to indicate, in connection with a certain opening or place on the dial-plate or other fixed object, the position of the stop-cock or other object for the movement of which the apparatus is designed, substantially as described.

3. The revolving arm and spring-tooth M m , operating in connection with the stud c' or its equivalent, to rotate the wheel D by engagement with the cogs thereof, as described.

4. The combination of the shaft B, wheel D, spring-tooth m , arm O, and spring-detent N, as and for the purpose described.

5. The arrangement of the key G and spring-keys $g g' g''$ with the portions $d d' d''$, constituting the wheel D.

6. The arrangement of the shaft B, studs $r r$, wheel S, and detent s , the pinion T, spur-wheel U, and dial V, operating substantially as and for the purpose described.

To the above specification of my improvement I have signed my hand this 30th day of July, 1866.

SAML. GARDINER, JR.

Witnesses:

EDWARD H. KNIGHT,
EDM. F. BROWN.