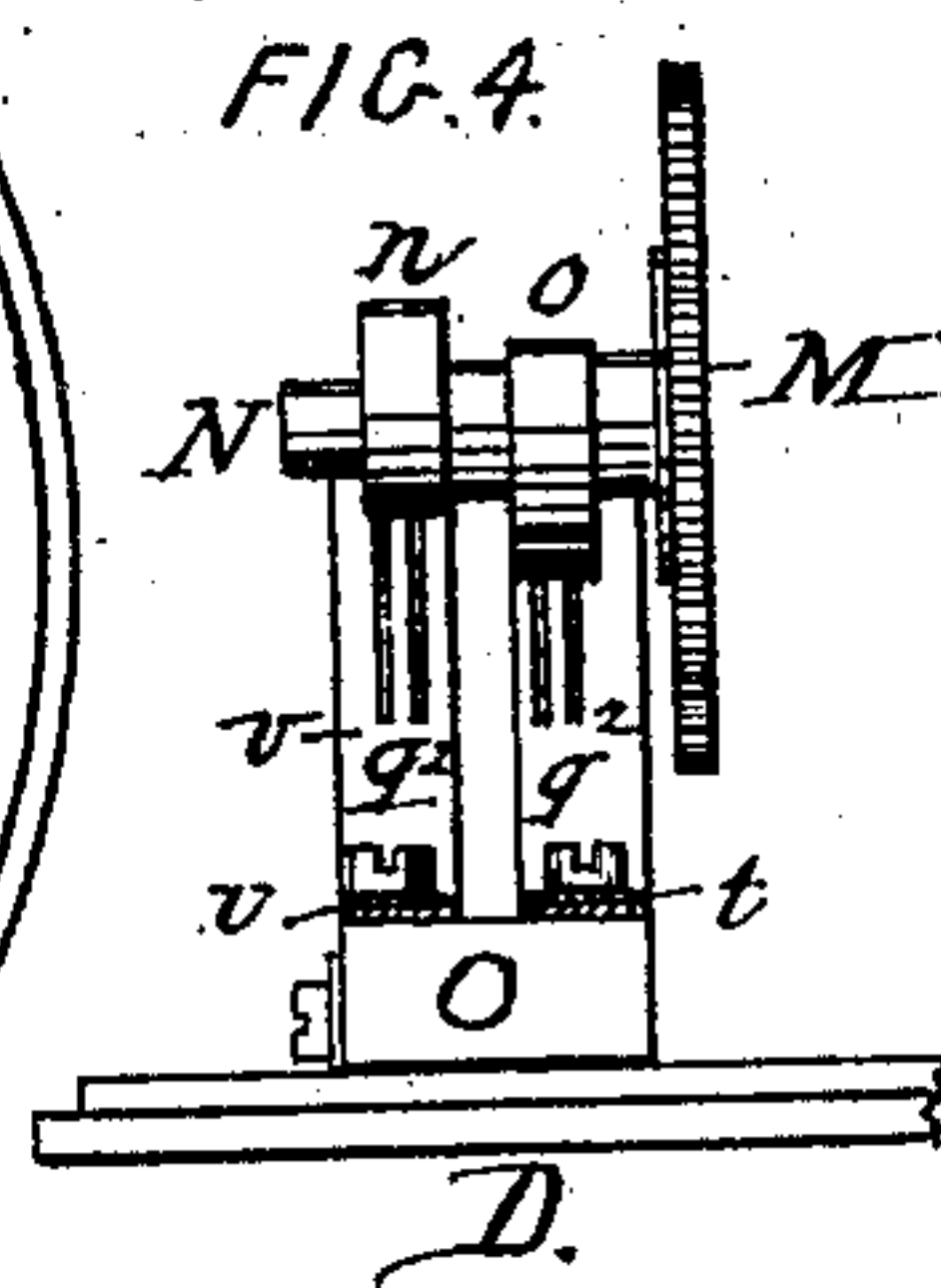
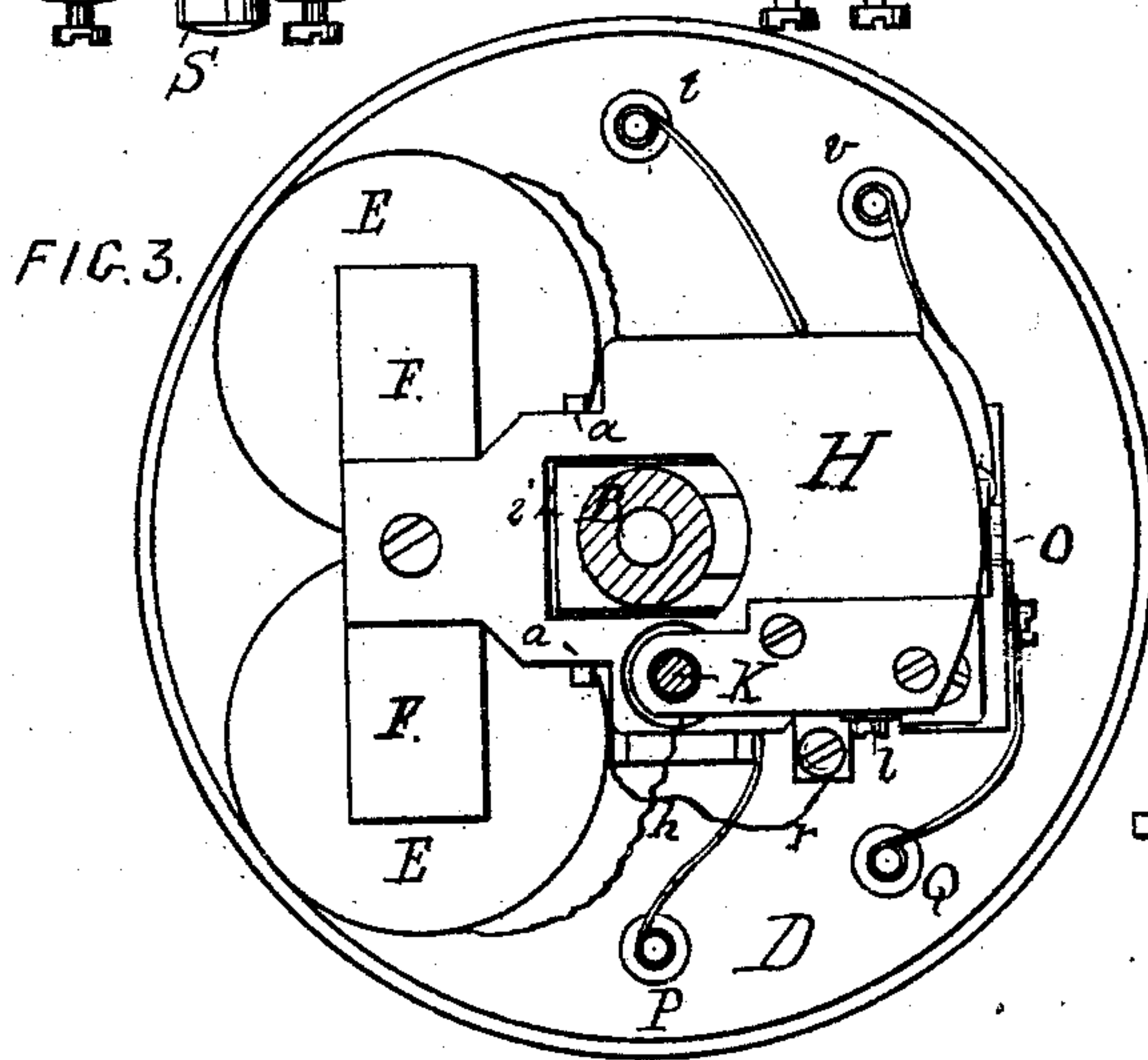
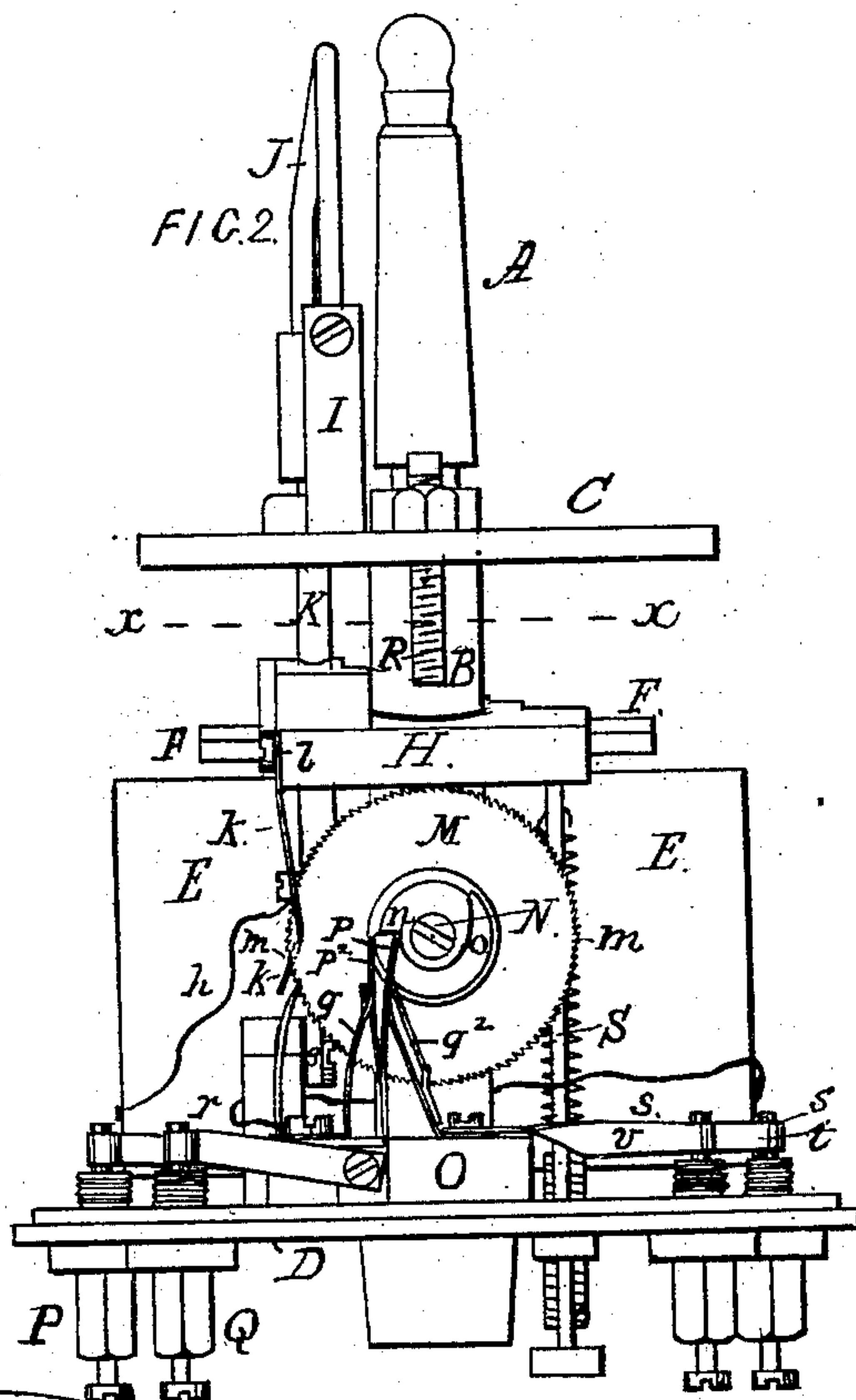
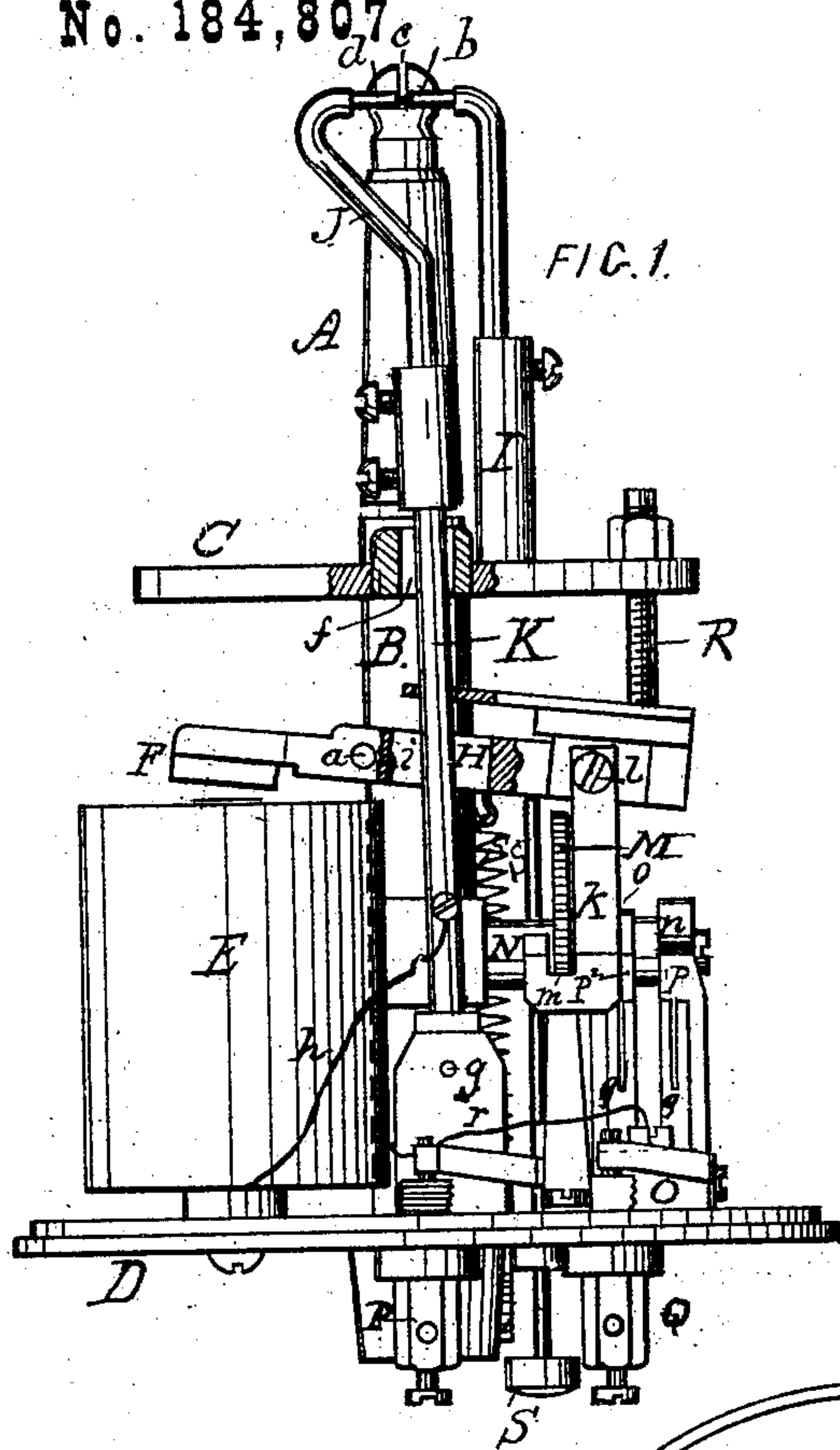


J. P. TIRRELL.

ELECTRIC GAS-LIGHTING APPARATUS.

No. 184,807

Patented Nov. 28, 1876.



WITNESSES

Geo. H. Carl
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UNITED STATES PATENT OFFICE.

JACOB P. TIRRELL, OF SOMERVILLE, MASSACHUSETTS.

IMPROVEMENT IN ELECTRIC GAS-LIGHTING APPARATUS.

Specification forming part of Letters Patent No. **184,807**, dated November 28, 1876; application filed January 14, 1876.

To all whom it may concern:

Be it known that I, JACOB P. TIRRELL, of Somerville, in the county of Middlesex, and State of Massachusetts, have invented certain new and useful Improvements in Electrical Gas-Lighting Apparatus, of which the following is a specification:

This invention relates more particularly to the electrical gas-lighting apparatus embraced and described in the schedule annexed to the Letters Patent of the United States issued to me, dated August 20, 1872, numbered 130,770; and it consists in certain improvements in the construction, combination, and arrangement of the parts embraced in said apparatus, all as hereinafter fully described.

In the accompanying plate of drawings, Figures 1 and 2 are views, in elevation, from different sides; Fig. 3, a section in line *x x*, Fig. 1.

In the drawings, A represents a gas-burner, to which B is the feed-pipe, provided with two horizontal platforms, C and D, for carrying the electrical gas-lighting apparatus; E, an electro-magnet, vertically secured to lower platform D, at one side of the gas-pipe; F, the armature to magnet E. This armature is at the upper end of the magnet E, and it is carried by a horizontal lever, H, hung on a fulcrum, at *a*, of the gas-pipe B. I, a post, fixed to upper platform C, and in electrical communication with the earth. This post I has a point, *b*, which is near the burner-slit *c*, and at this point *b*, in the operation of the apparatus, the electrical current is broken by the movement of the circuit-breaker J, which has its point *d* in contact with the point *b* of the post I when it—the circuit-breaker—is at rest. The circuit-breaker is fastened to a vertical rod, K. This breaker-rod K passes loosely through an insulated hole, *f*, of the upper platform C, and also through an insulated hole, *i*, of the armature-lever H and at its lower end it turns on an insulated center, *g*, of the lower platform. H, a wire, connecting breaker-rod K with one pole of the U-magnet E; *k*, a spring-pawl, suspended, at *l*, from the armature-lever H, and engaging with the ratchet-toothed edge *m* of a ratchet-wheel, M, which is fixed to the spindle N of the gas-cock. This pawl *k* is hung so that it can swing sidewise,

or across the ratchet-edge of the ratchet-wheel, as the armature-lever moves, and thus adjusts itself to the movement of the lever, which carries it without losing its bearing or hold on the ratchet-teeth. *n o*, two cams, fixed on, and insulated from, the gas cock spindle, N. These cams are of similar shape, and on each cam bears a separate vertical spring-finger, P P², both of which are secured to a common insulated block, O, of the lower platform D. The cam-fingers are each between a common pair of vertical spring-fingers, *q q*², which are fixed to the insulated block O, above referred to, and one spring-finger, *q*, of the pair *q q*², is, by a wire, *r*, connected with the opposite pole of the magnet to that with which the circuit-breaker J is connected, as hereinbefore stated. Fig. 4 is a detail view, showing the spring-finger *q*². The other finger, *q*², of the pair of spring-fingers *q q*², is in two separate parts, both of which are connected by separate wires *s* to the vertical spring cam-fingers of the next burner, and of these wires one, *t*, is the turning-on wire, and the other, U, the shutting-off wire. P, the turning-on wire, and Q the shutting-off wire, of the burner illustrated. These two wires lead from the electric battery employed, and the wire P connects with one, *p*², and the wire Q with the other, *p*, of the vertical cam-fingers. The spindle-cams *o n* are of such shape that, when the finger *p*² of the one cam is against the spring-finger *q*, the finger *p* of the other cam, *n*, will be against the one part, *v*, of the divided and separated spring-finger *q*², and vice versa, and thus, under the rotation of the cams, the electrical current is thrown into and out of the electrical conducting-wires of the apparatus, substantially as described in the Letters Patent before referred to, and for the same purposes, and therefore needing no more particular description herein.

The armature F, under the electrical current, alternately moves toward and away from the magnet, and, as the circuit-breaker J passes through it, as described, the circuit-breaker is operated, and made to alternately break and establish the circuit at the burner-slit, a spark being ignited each time the circuit is broken, as aforesaid. The backward and forward movement of the armature op-

erates the ratchet-wheel, and thus is turned on and off, and otherwise than has been herein particularly described this apparatus works and is worked substantially as the apparatus of the said Letters Patent hereinbefore referred to.

R, a screw, working through upper platform, in a direction for the armature-lever H to abut against it as the armature moves toward the magnet. By adjusting this screw the length of the movement of the armature may be regulated, and thus also the throw of the circuit-breaker. S, a pusher-rod, working through lower platform. This pusher-rod S is for operating the armature-lever H, in case the magnet should fail.

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

1. The armature-lever H and circuit-breaker K, combined together, and arranged substantially as described.

2. The spring-pawl *k*, hung on armature-lever H, so that it can swing sidewise, substantially as and for the purpose specified.

3. The push-rod S, arranged to operate armature-lever H, substantially as and for the purpose described.

J. P. TIRRELL.

Witnesses:

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