

(No Model.)

H. T. DOWNS.

SYSTEM OF ELECTRICAL GAS LIGHTING AND EXTINGUISHING.

No. 389,692.

Patented Sept. 18, 1888.

Fig. 1.

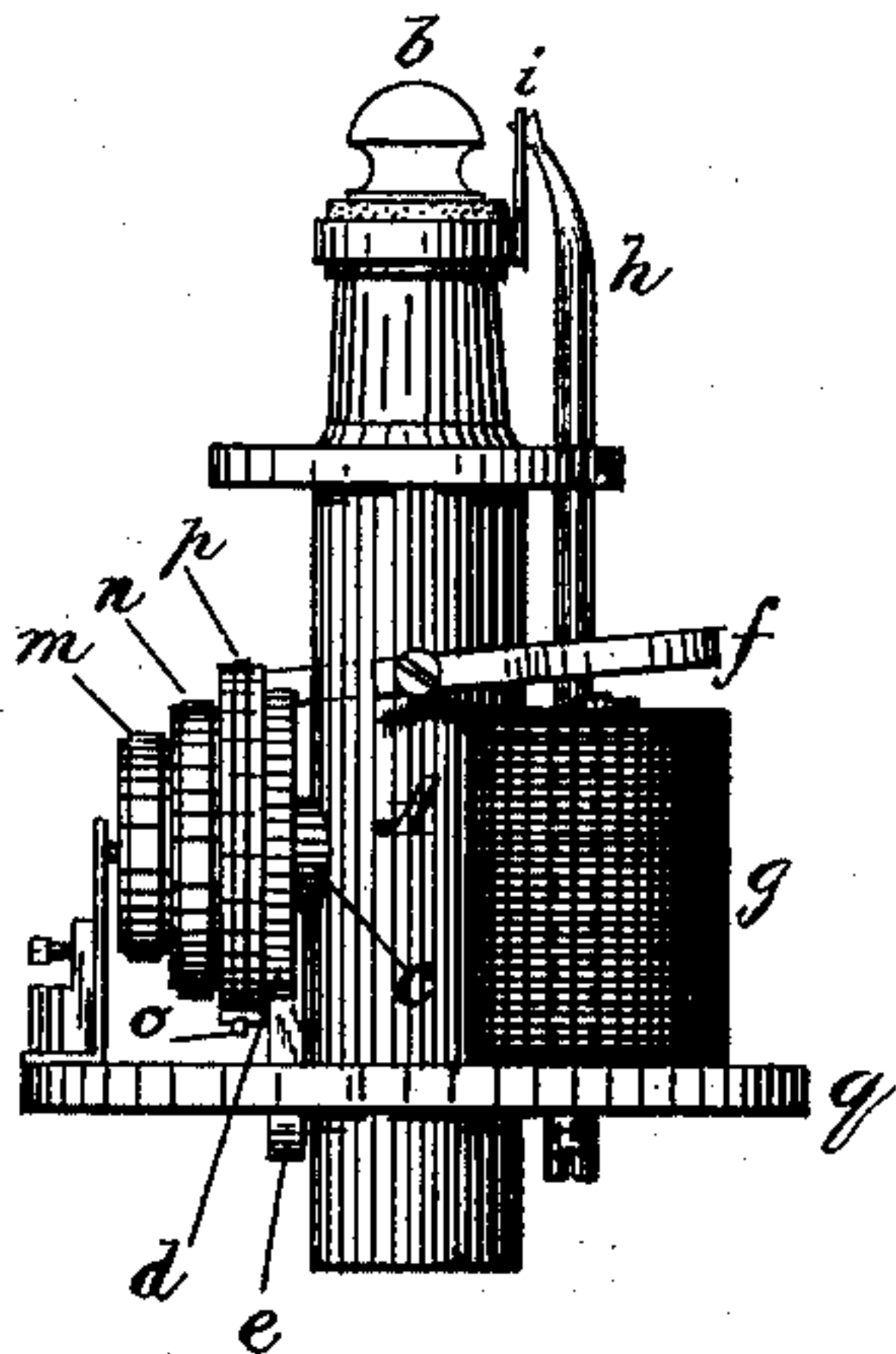


Fig. 2.

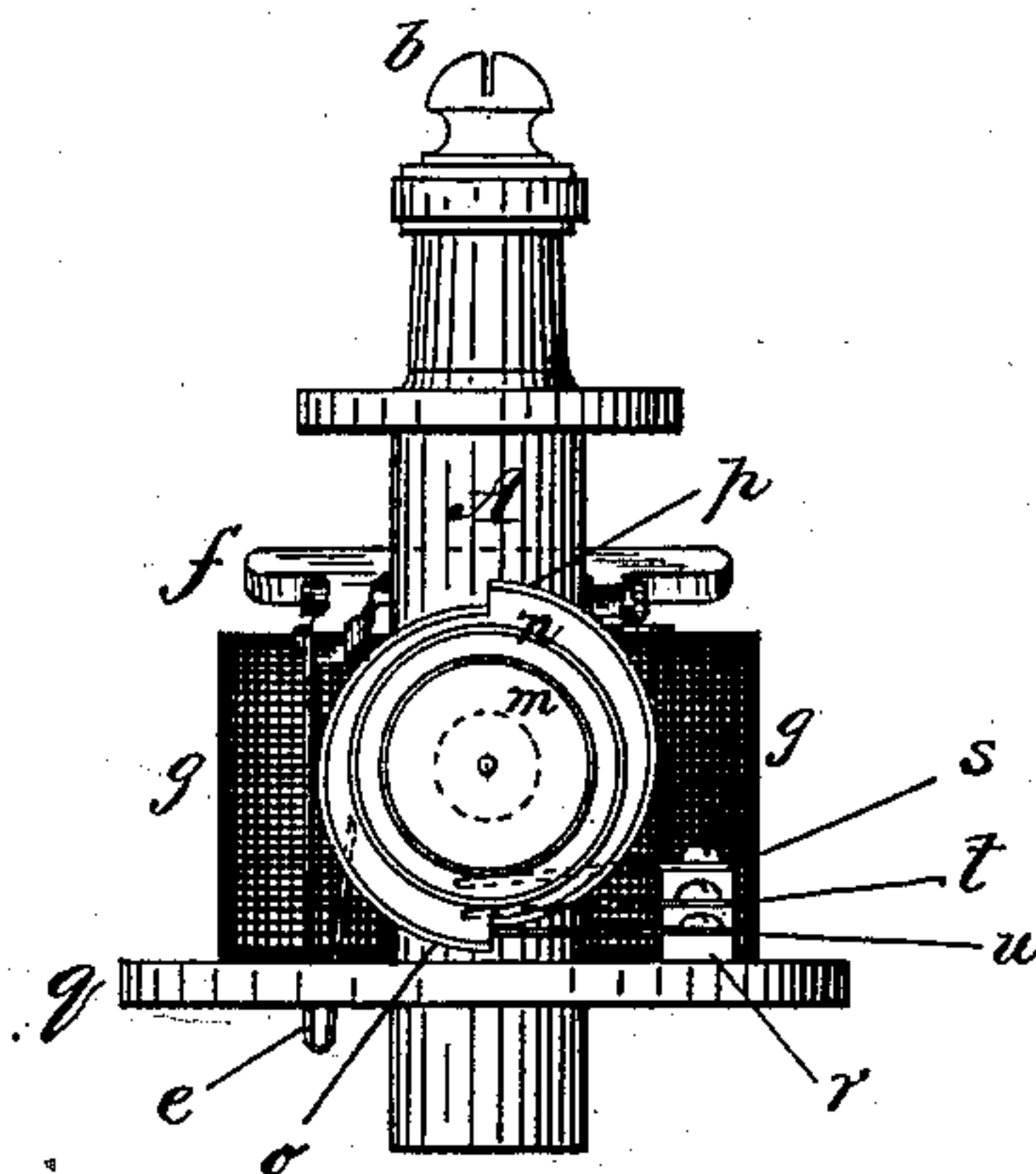
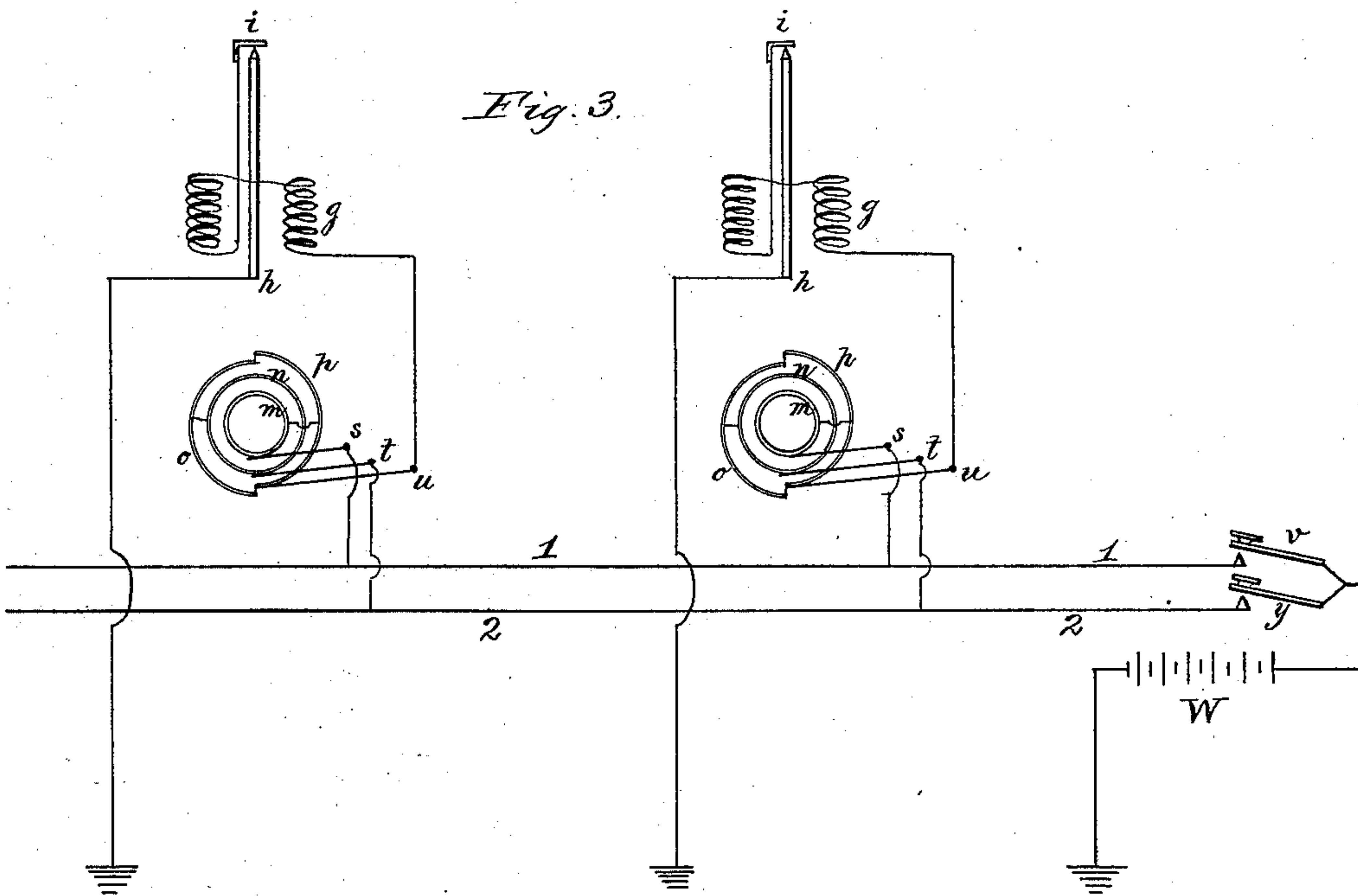


Fig. 3.



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## SYSTEM OF ELECTRICAL GAS LIGHTING AND EXTINGUISHING.

SPECIFICATION forming part of Letters Patent No. 389,692, dated September 18, 1888.

Application filed December 20, 1887. Serial No. 258,511. (No model.)

*To all whom it may concern:*

Be it known that I, HARRY T. DOWNS, a citizen of the United States, residing at Saratoga Springs, in the county of Saratoga and State of New York, have invented certain new and useful Improvements in a System of Electric Gas Lighting and Extinguishing; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has for its object the organization of a system whereby a number of gas-burners may be arranged with lighting and extinguishing appliances in electric circuit and a battery and circuiting devices at a station suitably located, the whole system adapted for operation in such manner that by the simple act of closing a circuit at such station all the burners so connected can be turned on and lighted and similarly extinguished.

The invention consists in the arrangement and combination of circuits and devices, substantially as hereinafter more fully described and claimed.

The drawings show the invention as applied to a type of burner or electric gas-lighter known as the "Automatic"—that is, the gas-valve is rotary and is controlled by a ratchet-wheel, which is rotated by a spring-pawl attached to a pivoted armature in such manner that the oscillations of the armature drive the ratchet-wheel around, a half-revolution opening the valve, and another half closing it. The oscillations of the armature are obtained by an automatic circuit-breaker or vibrator, the spark of whose break serves to light the gas, for which purpose it is arranged in lighting proximity to the gas-orifice of the burner-tip.

Figures 1 and 2 are two similar elevations, taken at right angles to each other, of such a gas-burner and attachments with my invention applied thereto. Fig. 3 is a diagram showing circuits and the manner in which two or any number of burners are included in one system controlled from a single point.

A designates the burner-fitting, having a lava or other tip, *b*. The valve-stem *c* projects laterally, and has fixed thereon the ratchet-wheel *d*, which is driven around by the spring-pawl *e*, attached to the pivoted armature *f*. Armature *f* is operated by the electro-magnet *g*,  
and is arranged so that at the last part of its attractive motion it pulls down the spring propelled break-arm *h* and opens the contact with the finger *i*. Thus on closing the circuit armature *f* is drawn down, wheel *d* partially rotated, and circuit automatically broken at *i*, thus retracting the armature, which again closes the circuit at *i*, and so on till the gas is turned on by valve-stem *c*, upon which the spark at *i* ignites it. Then the circuit must be opened at some other point and left open.

My invention is now to be applied. To the extension of stem *c*, I attach a wheel or disk of insulated material, and on the rim (which for the sake of clearness is shown of three different diameters in step form) are placed two separate complete bands of metal marked, respectively, *m* and *n*. A third portion, is cut in the form of a double cam, each cam having a metallic band or wire on its face, as indicated by *o p*. Band *n* is electrically connected with semi-band *o*, and band *m* with semi-band *p*, as shown.

Upon the base *q*, I place a block of insulating material, *r*, on which I place three brushes, brush *s* bearing on band *m*, brush *t* bearing on band *n*, and brush *u* bearing successively on the semi-bands *o* and *p* as the valve stem rotates, but never on both at once. The circuits are as follows: At the operating-station is a battery, *W*, one pole of which is grounded. The other pole is connected with two keys, *v y*, or circuit-closers, which respectively close the circuits 1 and 2.

Fig. 3 represents the working parts in position, gas not being turned on. Line 1 is connected in multiple with all the brushes *s* and line 2 in multiple with all the brushes *t*, according to position. The circuit then passes by brush *u* to magnet *g*, to finger *i*, to vibrating break-arm *h*, thence to ground, as shown. To turn on and light the gas simultaneously at all the burners, I simply close the key *v* and hold it closed long enough to secure the rotation of the valve-stem to open position—i. e., one half-revolution. For such operation the current passes along line 1 into the brushes *s* and rings *m*, which are electrically connected to semi-bands *p*. Thence current traverses the magnets *g*, fingers *i*, arms *h*, and goes to ground. By the operation already described the valve-stems are rotated half-way and the gas turned



on and lighted. As soon as brushes *u* pass off the segments *p* onto segments *o*, the circuit is broken, and the condition remains thus until it is desired to extinguish the gas-lights. If in the lighting operation any one of the valve-stems is sluggish and hard to move, it may remain so till some of the other lights are lighted, and as this progresses the external resistance rises and more electro-motive force becomes available from the battery, giving rise to more current, which will then concentrate in moving the tardy valves until all are lighted.

It is to be observed that when the semi-band *p* passes from under brush *u*, while the then-operating circuit over line 1 is broken at each burner and further action of the electric devices of each discontinued, the brush *u* closes contact on the semi-band *o* and remains there till it is desired to extinguish the lights. During this interval the closing of the key *v* has no effect; and this condition affords a reliable means of testing for leaks or faults, since if a galvanometer be placed in circuit 1 at the station the existence of a leak on the line will deflect the galvanometer needle upon the closing of key *v*. Similarly line 2 can be tested while line 1 is closed through bands *p*.

When it is desired to extinguish the lights, I have only to close key *y* for a sufficient time. The battery-current now flows out over line 2, whence it divides through brushes *t*, passes thence by rings *n* to semi-bands *o*, which are now in contact with brushes *u*, whence the current goes, as before, through magnets *g* and automatic breaks *h i*, to ground. This of course causes the rotation of the valve-stems half-way, cuts off the gas, and ends by throwing brushes *u* off semi-bands *o* onto semi bands *p* again, thus opening the previously-closed circuit 2 and leaving circuit 1 closed and in operative condition.

Obviously the invention may be put in operation with various styles of valve-operating and lighting devices, and I therefore do not confine its scope to any particular device in this connection.

What I claim as my invention is as follows:

1. An electric gas lighting and extinguishing system comprising a station-battery and two lines having a common return, both said lines being normally open at the station, and two or more electric gas lighting and extin-

guishing burners arranged and adapted to be placed in either of said circuits at will, substantially as described.

2. An electric gas lighting and extinguishing system comprising a station-battery and two lines therefrom having a common return and both provided with normally-open circuit-closers at the station, in combination with electro-magnetically-operated gas-burners circuited in multiple between one of said lines and the common return, and having electrically-operated local switching or shifting devices controlled by said station circuit-closers, substantially as described, whereby the closing of one of said keys lights the gas and locally shifts the circuit to the other line.

3. In a system of electric gas lighting and extinguishing comprising two or more burners and electro-magnetic lighting and extinguishing devices locally attached thereto, the combination therewith of two lines from a single battery, a common return therefor, and electro-magnetic circuit-shifting devices applied to said burners, constructed and adapted to shift the circuit alternately from said lines to the common return and dependent for operation on the presence or absence of current in one of said lines, substantially as described.

4. In an electric gas lighting and extinguishing apparatus, a rotary commutator, *m n o p*, and the brushes *s t u*, bearing thereon, as described, in combination with the gas lighting and extinguishing devices, and two lines leading from a battery to said brushes *s t*, respectively, and brush *u* being connected to ground through said devices, substantially as described.

5. In an electric gas lighting and extinguishing system, the combination of two lines from a station-battery and a single return thereto, with two or more electro-automatic burners and corresponding electro-magnetic circuit-shifters adapted to close said lines in succession to the return in multiple arc, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HARRY T. DOWNS.

Witnesses:

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EDITH DORCAS MYERS.