

(No Model.)

G. F. PINKHAM, J. P. TIRRELL & W. S. HILL.
Electric Gas Lighting Apparatus.

No. 230,567.

Patented July 27, 1880.

Fig. 2.

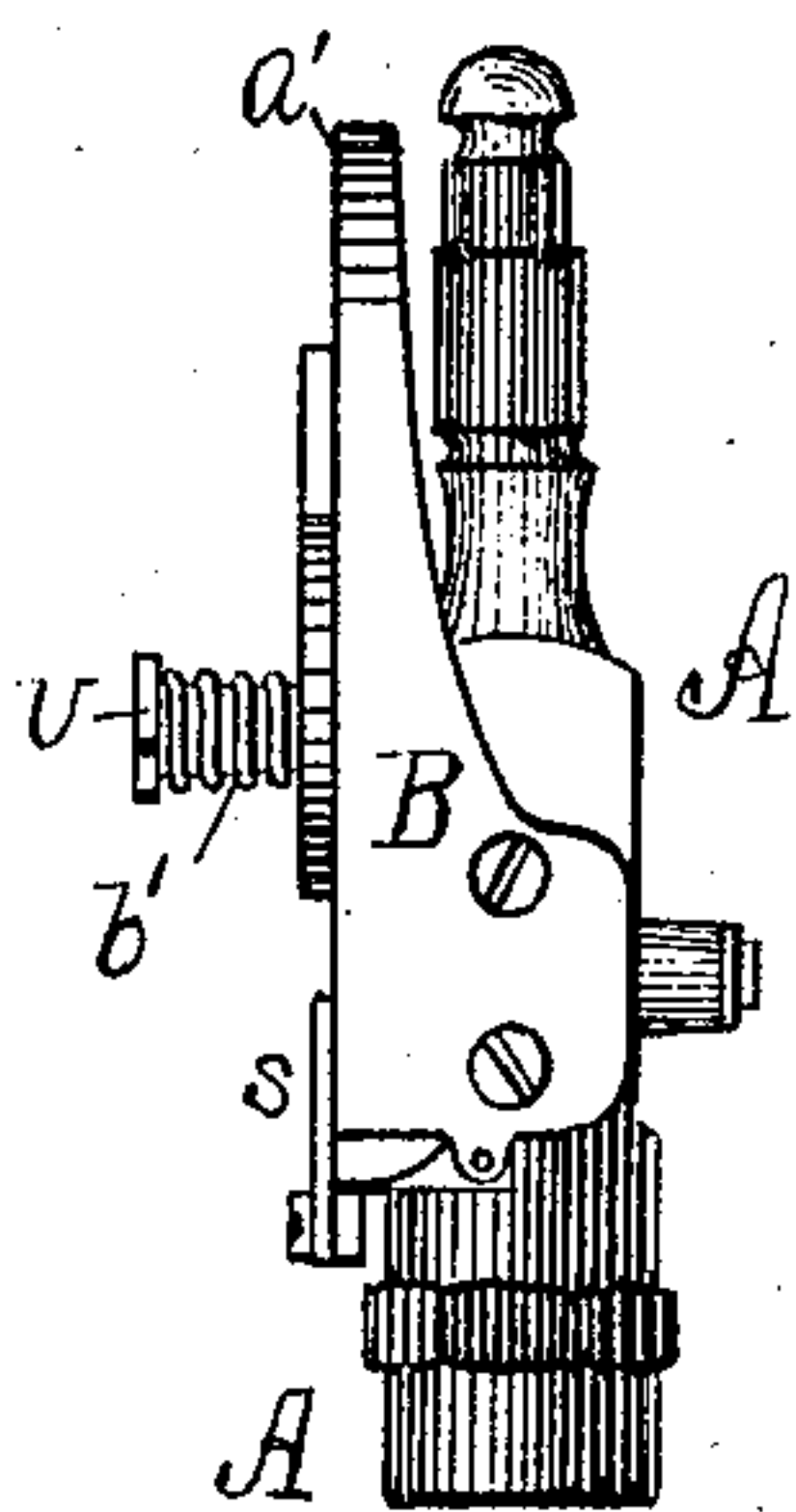


Fig. 1.

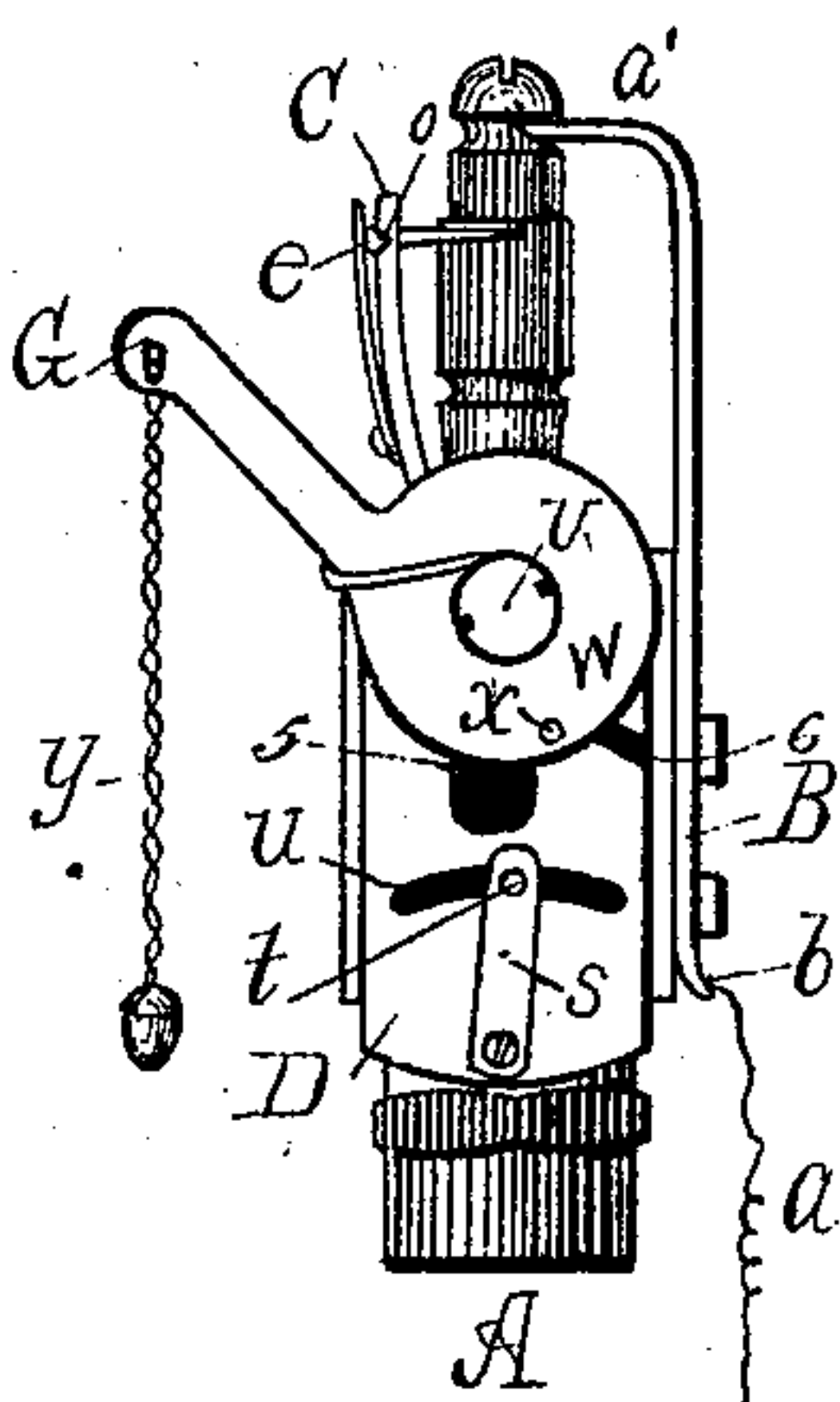


Fig. 3.

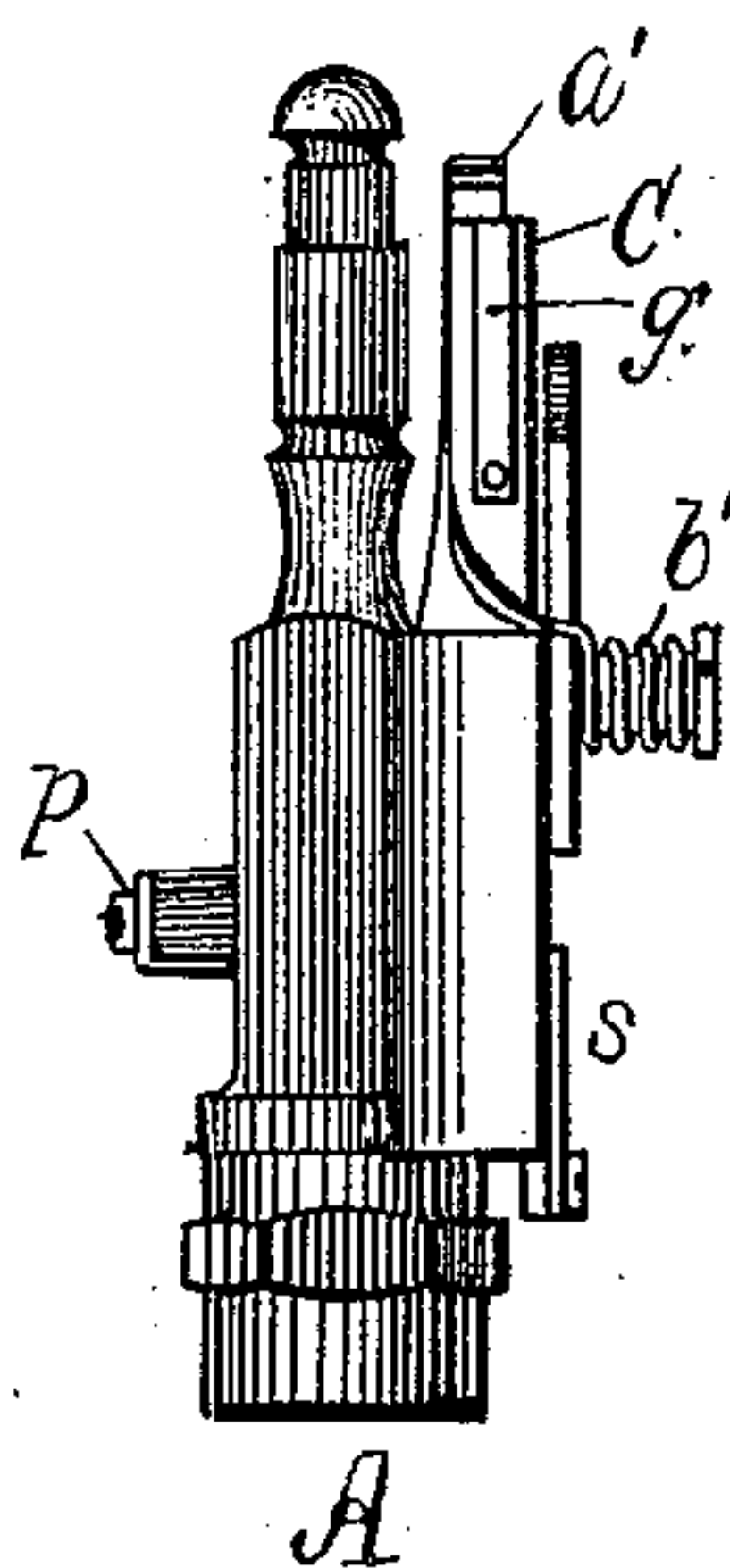


Fig. 4.

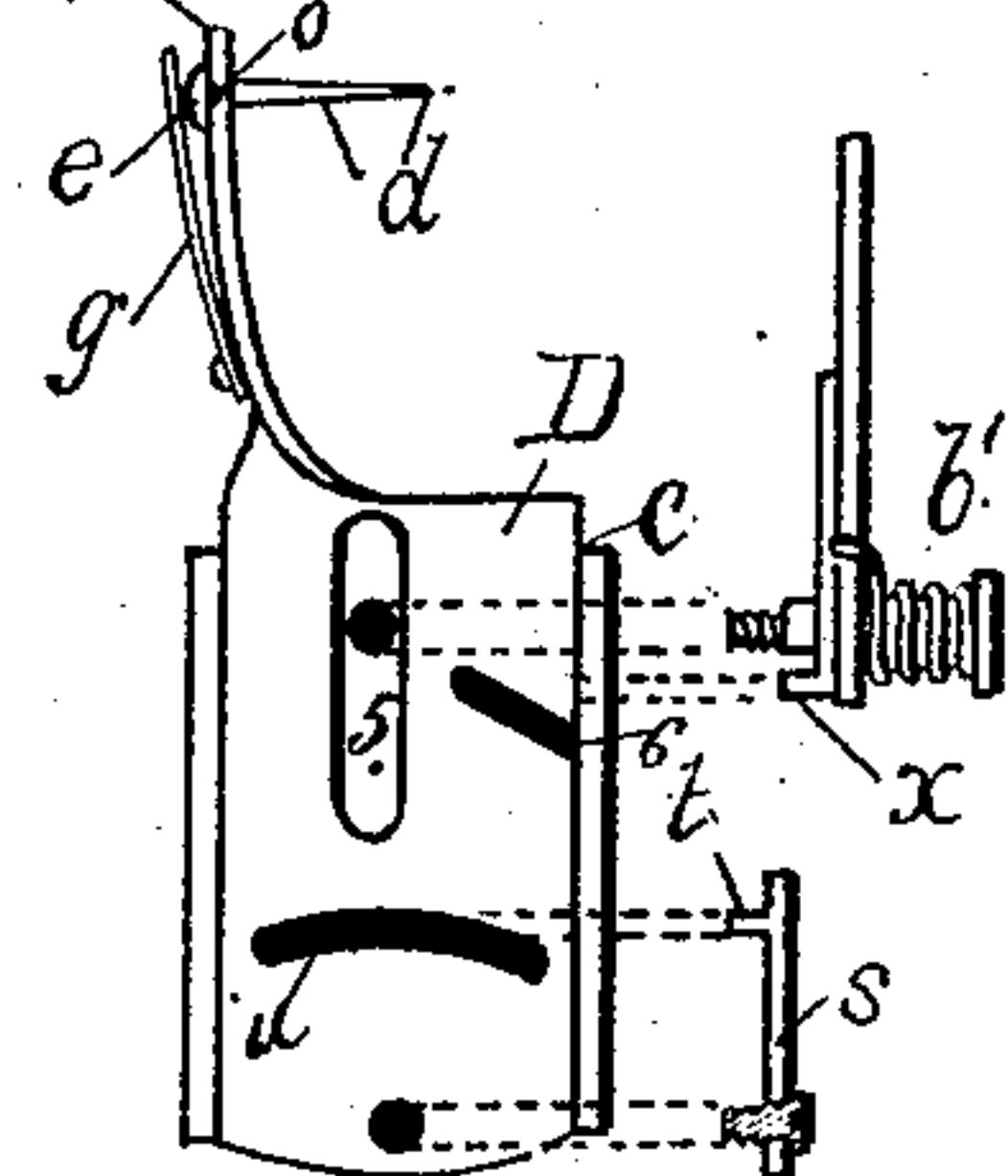


Fig. 5.

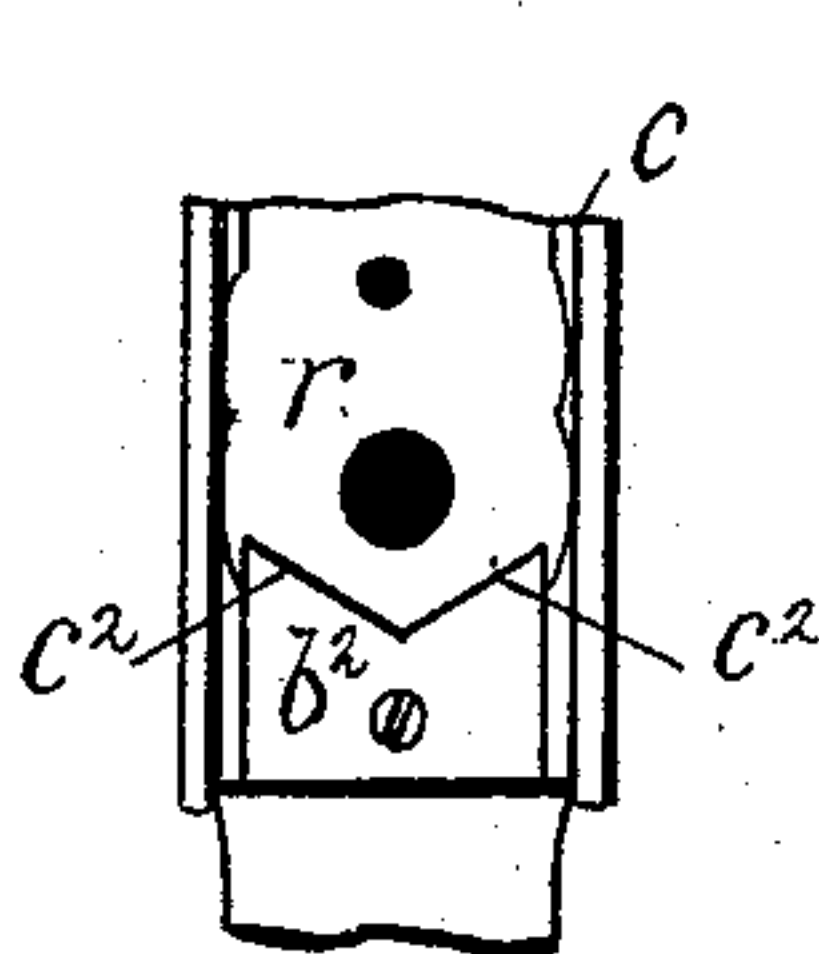


Fig. 6.

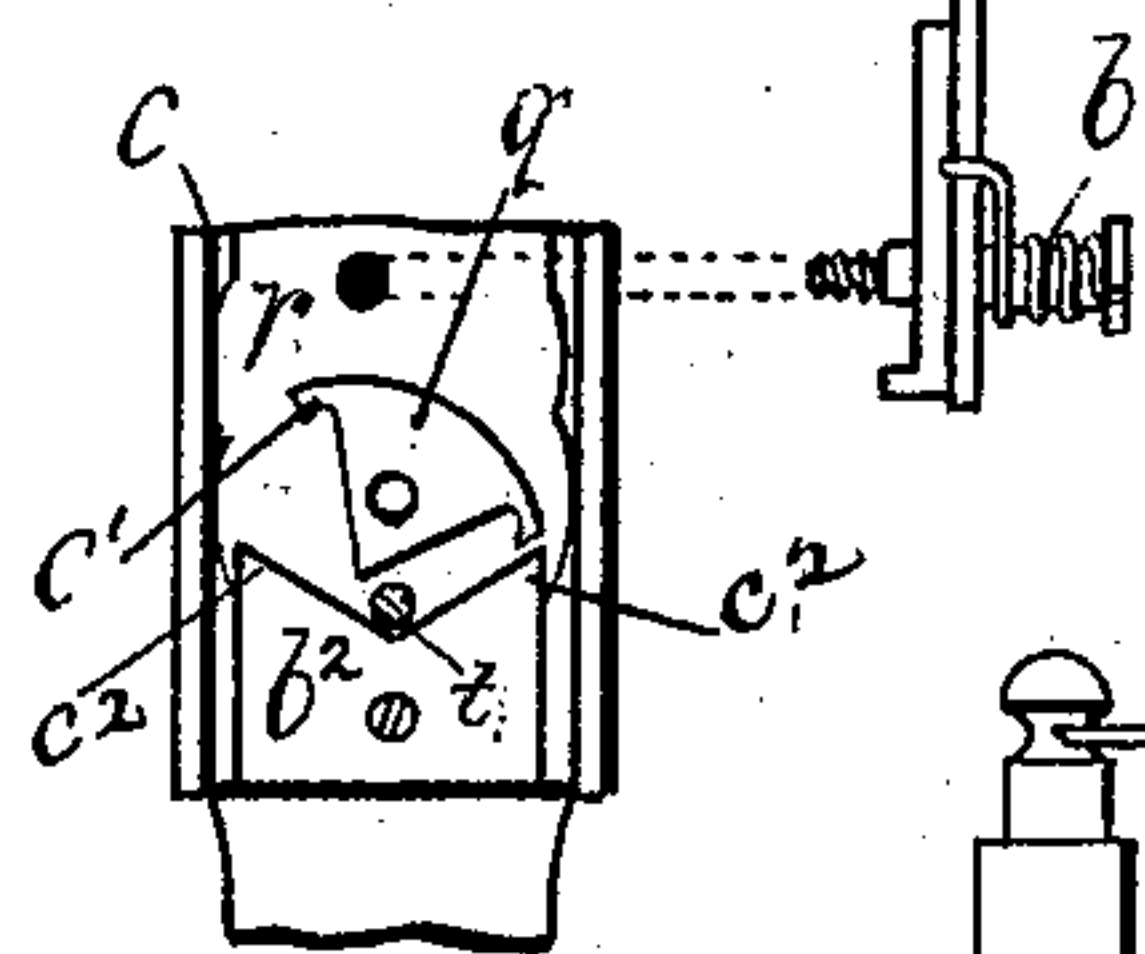


Fig. 7.

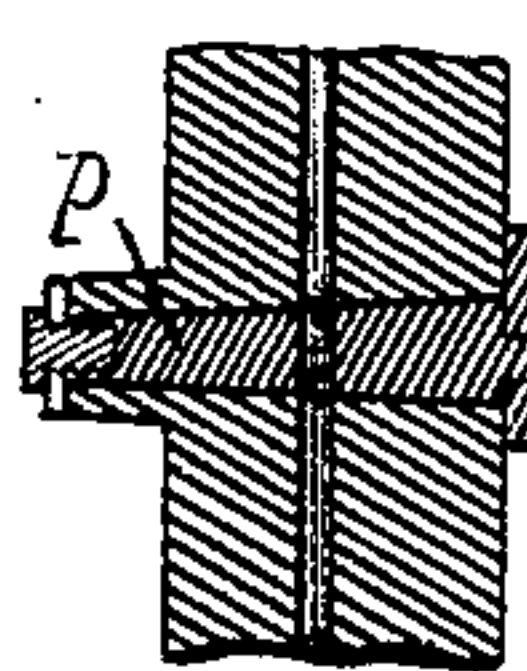


Fig. 8.

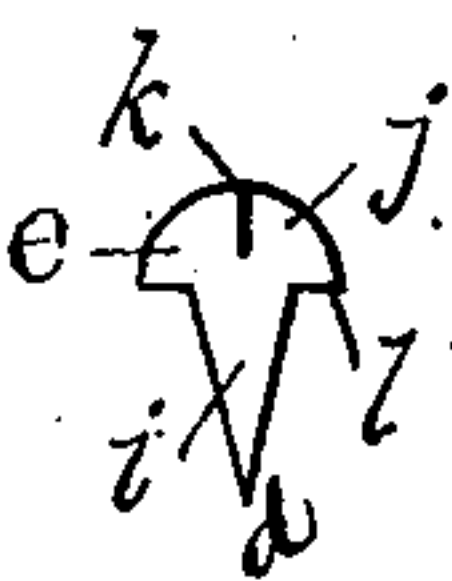


Fig. 10.

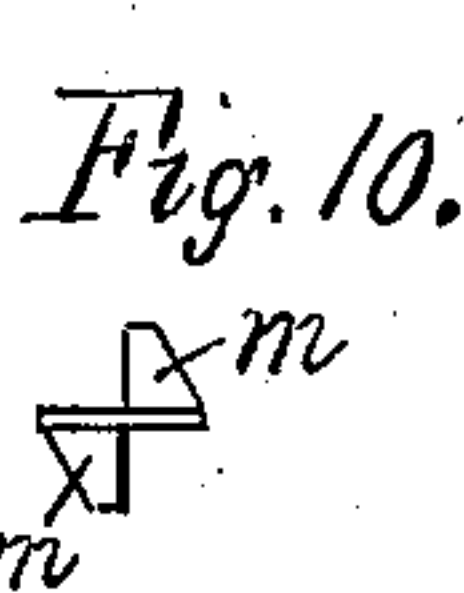


Fig. 9.

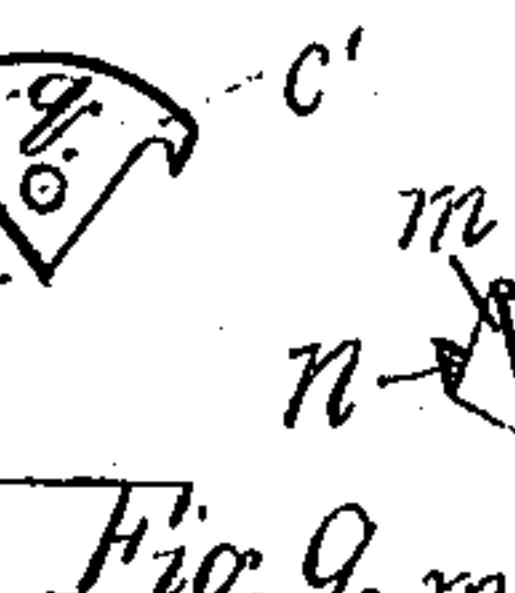
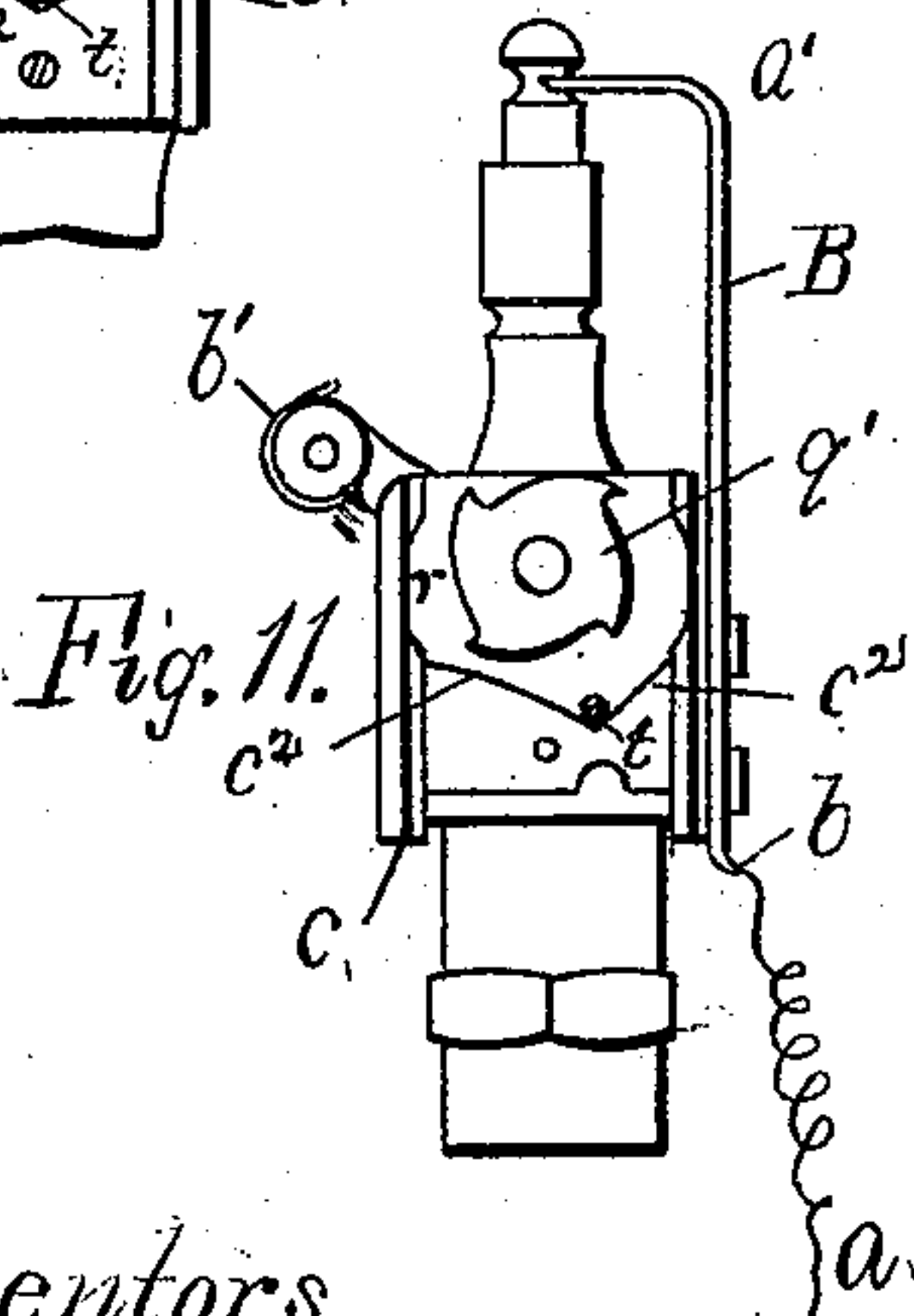


Fig. 11.



Witnesses.

H. E. Lodge.
A. L. Reed

Inventors.

Geo. F. Pinkham
Jacob P. Tirrell
Warren S. Hill

UNITED STATES PATENT OFFICE.

GEORGE F. PINKHAM, OF QUINCY, JACOB P. TIRRELL, OF SOMERVILLE,
AND WARREN S. HILL, OF HYDE PARK, ASSIGNORS TO GEORGE F.
PINKHAM, OF QUINCY, MASSACHUSETTS.

ELECTRIC GAS-LIGHTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 230,567, dated July 27, 1880.

Application filed May 22, 1880. (No model.)

To all whom it may concern:

Be it known that we, GEORGE F. PINKHAM, residing in Quincy, county of Norfolk, JACOB P. TIRRELL, residing in Somerville, county of Middlesex, and WARREN S. HILL, residing in Hyde Park, county of Norfolk, all in the State of Massachusetts, and citizens of the United States, have invented certain new and useful Improvements in Electric Gas-Lighting Apparatus; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a class of gas-lighting apparatus in which an electric spark is generated over or in close proximity to a gas-burner by the establishing and breaking contact of two electrodes connected by proper conductors with an electric battery, one electrode being fixed to and insulated from the burner, and the other a movable arm adapted to move past the fixed arm and carrying an elastic circuit-closer so arranged that as said elastic circuit-closer passes the fixed electrode it will make and break contact with the latter.

Our improvements consist in the employment of a vertically-sliding plate or carrier playing in or upon guides in the body of the burner and carrying a dog which actuates a peculiarly-formed vibrating plate attached to the gas-cock, the said vertically-sliding plate carrying the flexible electrode and being operated by a lever, as hereinafter explained.

Our improvements consist, secondly, in the peculiar manner of attaching the flexible contact-point of the movable electrode to the arm which supports it, as will be hereinafter explained.

The drawings accompanying this specification represent, in Figure 1, a front view, and in Figs. 2 and 3 side elevations, of a device containing our invention. Fig. 4 is a face view of the carrier-plate and its details; Figs. 5 and 6, face views of the front central portion of the gas-burner, and Fig. 7 a vertical section through the vibrating plate attached to the gas-cock. Fig. 8 is a view of the blank from which the flexible contact-point is formed,

and Figs. 9 and 10 are views of the completed point. Fig. 11 is a modification of our invention.

In said drawings, A represents a gas-burner, to one side of which is affixed an upright post, B, terminating at top in an inwardly-projecting horizontal tip, *a'*, which stands in immediate proximity to the outlet of the burner, such post being insulated from the burner in any suitable manner, and constituting the fixed electrode of the apparatus, a wire, *a*, from one pole of a battery being connected with this electrode, as shown at *b*, the body of the burner and the gas-pipe connected with it being the other pole or ground-wire of the battery.

The movable electrode is shown at C as an upright arm erected upon or making part of a flat plate, D, which we term the "sliding carrier," this plate being disposed flatwise upon the front face of the body of the burner, and playing within a vertical channel, *c*, created in such face.

The flexible, yielding, or vibrating contact-point or circuit-closer is shown at *d* as a thin plate of metal reduced to a point at its contact end, where it makes contact with the fixed electrode, and at its outer end is formed into a flat head, *e*, to abut against the outer face of the arm, the said electrode *d* being passed through an aperture in the upper part of the arm C, and so arranged with respect to the tip *a'* of the post B that when in an inactive or normal position it stands at a point below such tip *a'*, and to reach in its highest position a point above said tip, the movement of the carrier-plate D making this change in position of the point *d*.

As the contact-point or flexible electrode *d* passes the tip *a'* of the fixed electrode it wipes against and makes contact with the latter for a short interval of time, and an electric current is established, and as the point *d* passes by and leaves the tip *a'*, and opens the circuit, a spark results, which ignites the gas issuing from the burner, the carrier and contact-point being returned to their normal position by a coiled spring, as hereinafter explained.

As this method of igniting the gas by making

and breaking an electric current in close proximity to the outlet of the burner has been fully described in previous patents, a repetition of such description is not deemed essential in this specification, especially as our present improvements consist in mechanical devices for actuating the movable electrode and cock of the burner, and in the construction and application of the contact-point, and not in any change in the principle of lighting by electricity.

To secure the point *d* to the arm C in a manner which permits it to be easily removed and replaced, we secure at its lower end to the outer face of the arm C a flat spring, *g*, which, at its upper and free end, rests against the head of the electrode *d*, the stress of the spring providing an elastic or yielding seat to the point, which permits the latter to pass the tip *a'* of the post B without undue friction, and yet allow the two to remain sufficiently long in contact to insure a perfect closing of the electric circuit.

To form the head upon the circuit-closing point in a simple and inexpensive manner, we punch out from a thin sheet of metal a planchet or blank, (see Fig. 8 of the drawings,) the body *i* of which is pointed at *d*, and the head *j* semi-circular or approximately so, and wider than the body, and we then cut in the center of the head *j* a short longitudinal slit, *k*, which stops short of a line drawn through the lower edge or boundary, *l*, of the head.

The two portions *m m* of the head *j*, as shown in Fig. 9, are now bent over in opposite directions at right angles to the body of the point, thus providing bearings to abut against the arm C, and against which the spring *g* abuts.

Our object in not slitting the head *j* its entire length is to provide in the completed point shoulders *n n*, to enter notches *o o* in the outer face of the arm C, to prevent turning or twisting of the point in its seat, and to provide trunnions upon which it may freely rock.

To remove the contact-point it is only necessary to turn the spring *g* to one side sufficiently far to expose the head of such point, when the latter is readily detached.

The cock of the burner is shown at P as extending through to the front of the burner and having affixed to its front end a triangular toothed plate, *q*, this plate being disposed within a recess, *r*, in rear of the carrier-plate D, said cock being operated by a dog, *s*, pivoted at its lower end to the lower front part of the carrier, and having a horizontal stud, *t*, to engage the teeth of the plate *q*, a horizontal curved slot, *u*, being cut in the carrier to permit of the requisite play of the stud.

When at rest the lower apex of the triangular plate *q* stands in one or the other of its extremes of vibration, slightly to one side of a vertical line drawn through its axis, a hooked tooth, *c'*, being formed upon each upper corner.

To elevate the carrier we employ a lever, G, pivoted, as shown, to the body of the burner by means of a stud, *v*, passing through a slot,

5, in the vertically-moving plate D, the inner end, *w*, of this lever carrying a horizontal stud, *x*, which engages and plays back and forth in a diagonal slot, 6, in plate D, and the outer end of the lever bearing a short chain for raising plate D, the plate being retracted by a coiled spring, *b'*, one end of which is secured to the body of the burner and the other to the lever.

As the carrier-plate and dog rise the spur of the latter engages the tooth of the plate *q*, overhanging the spur, and the cock is opened, the carrier and dog settling back to place without effect upon the plate *q*. It will be seen that the action of the dog upon the triangular plate *q* reverses the position of the lower apex of the latter—that is, throws such apex to the opposite side of the axis of the plate, and so that when the dog rises the second time it will engage the opposite tooth, *c'*, and reverse the movement of the cock, thereby closing the latter.

Within the recess *r*, and below the plate *q*, we place a guide-plate, *b'*, having upon its upper edge two thin inclines or grades, *c' c'*, dropping at the center of the plate at about an angle of forty degrees, the point of junction of these grades being situated directly below the axis of the vibrating plate *q*.

As the carrier-plate and dog descend the spur of the dog comes in contact with the adjacent grade *c'*, and is forced by the latter to a position immediately below the axis of the plate *q*, and slightly to one side of the lower apex of the latter, and so that when the carrier and dog again rise the latter shall abut against the opposite tooth of the plate and cause a vibration of the latter in the opposite direction. The continued action of the dog upon the plate has the same effect—that is, to produce a rocking or vibrating movement of such plate.

A modification of the yielding contact-point *d* would be to form it of a plate sufficiently thin to possess an inherent elasticity, and thereby provide two sources of elasticity—that due to its own pliability and to the stress of the spring; or the spring may be sufficiently rigid to prevent any rocking movements of the contact-point in its seat, and depends alone upon the inherent elasticity of such point.

A modification of the vibrating plate which actuates the gas-cock is shown at *q'*, in Fig. 11 of the accompanying drawings, as a wheel having four teeth upon its periphery with ninety degrees of a circle intervening between each. The dog *s* is applied in the same manner as heretofore described, the stud *t*, however, rising and falling always on the same side of the wheel, owing to the unequal lengths of the diagonal guides *c' c'*, throwing their meeting-point to one side of the center of the wheel *q'*, and dog *s* has such a length of movement imparted to it by the ascent of the carrier as to turn the wheel and the gas-cock to which it is attached ninety degrees of a circle at every impulse, the result being that with one

ascent of the carrier and dog the cock is opened, and with the next succeeding ascent of such carrier and dog the cock is closed, and so on *ad infinitum*, one pull upon the cord or chain attached to the lever that operates the carrier having the effect of opening the cock and another pull of closing it, or vice versa, according to whether the gas is to be ignited or extinguished.

10 To prevent the stud of the dog escaping during its long ascent from the teeth of the wheel q' , we form the latter hook-shaped, as shown in said Fig. 11. We also employ, with the wheel q' and dog, double inclines $c^3 c^3$, similar to the inclines $c^2 c^2$, before explained, in order, with each descent of the dog, to force its spur to a point inside of the tooth next above such spur, to insure the engagement of the two when the dog begins its ascent.

20 We claim—

1. In an electric-lighting gas-burner, a vertically-moving plate, D, carrying a movable electrode, and actuating the gas-cock, for the purpose set forth.

25 2. The vertically-moving plate D, provided with the curved slot u , in combination with pivoted dog s , provided with stud t and vi-

brating plate q , attached to the cock, substantially as described.

3. In an electric-lighting gas-burner, the vertically-sliding plate D, carrying the electrode C, and provided with the slot 5, through which passes the lever-spindle, and the diagonal slot 6, in combination with the pivoted lever G, provided with the stud x , engaging in slot 6, as and for the purpose set forth.

4. In an electric-lighting gas-burner, a contact-point, consisting of the loosely-inserted pin d , in combination with the retaining-spring e and movable electrode C, as described.

5. The contact point or pin constructed from a blank, substantially as shown in Fig. 8, the head being formed by the oppositely-bent sections $m m$, and provided with the rib n , to enter notches o on the movable electrode C, as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

GEO. F. PINKHAM.
JACOB P. TIRRELL.
WARREN S. HILL.

Witnesses:

WM. T. WYMAN,
LOUIS E. HILL.