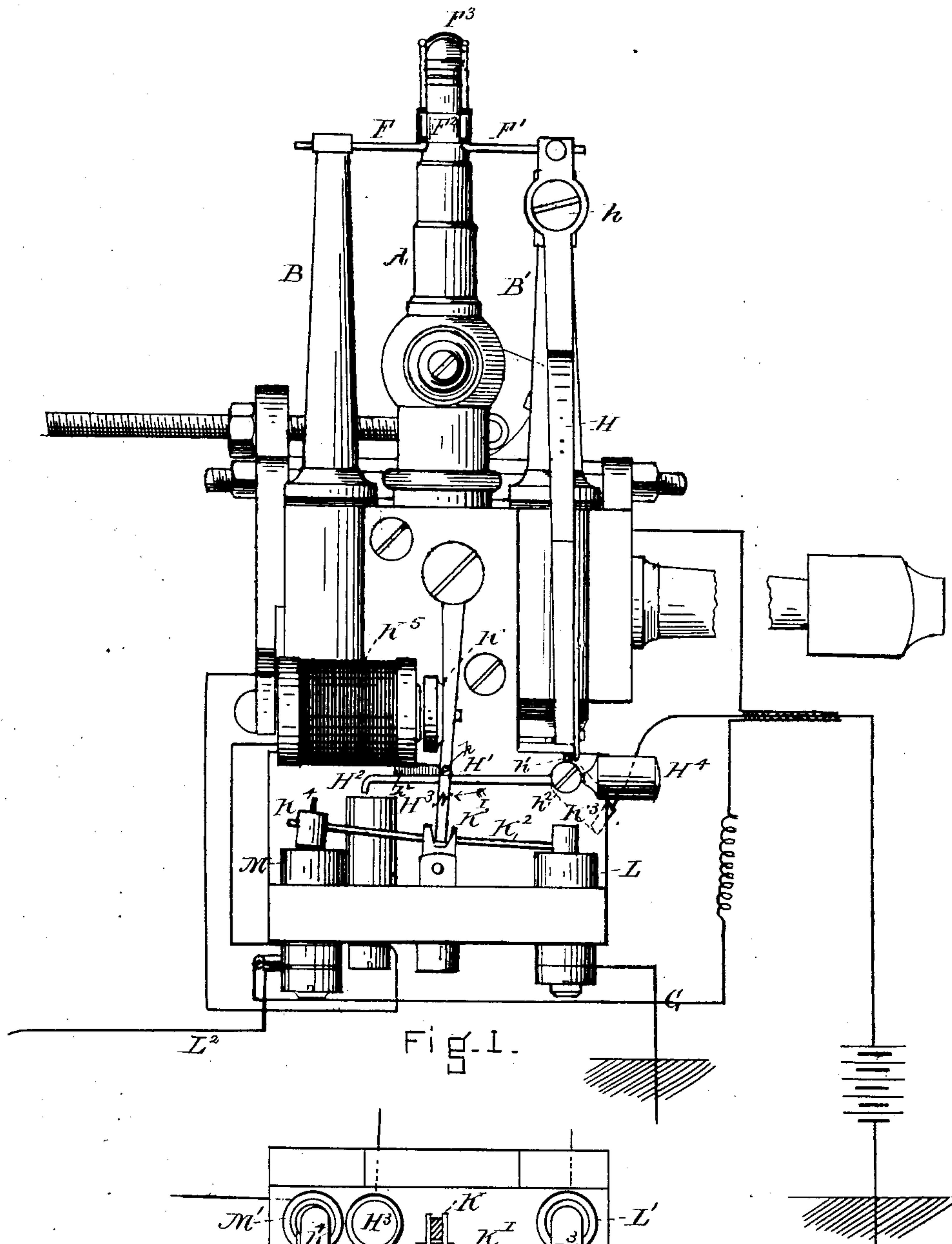


(No Model.)

4 Sheets—Sheet 1.

G. D. BANCROFT.  
Electric Lighting Device.  
No. 235,978. Patented Dec. 28, 1880.



WITNESSES:

Frank G. Parker,  
Helen M. Fregan

Fig. 5.

INVENTOR:

George D. Bancroft.

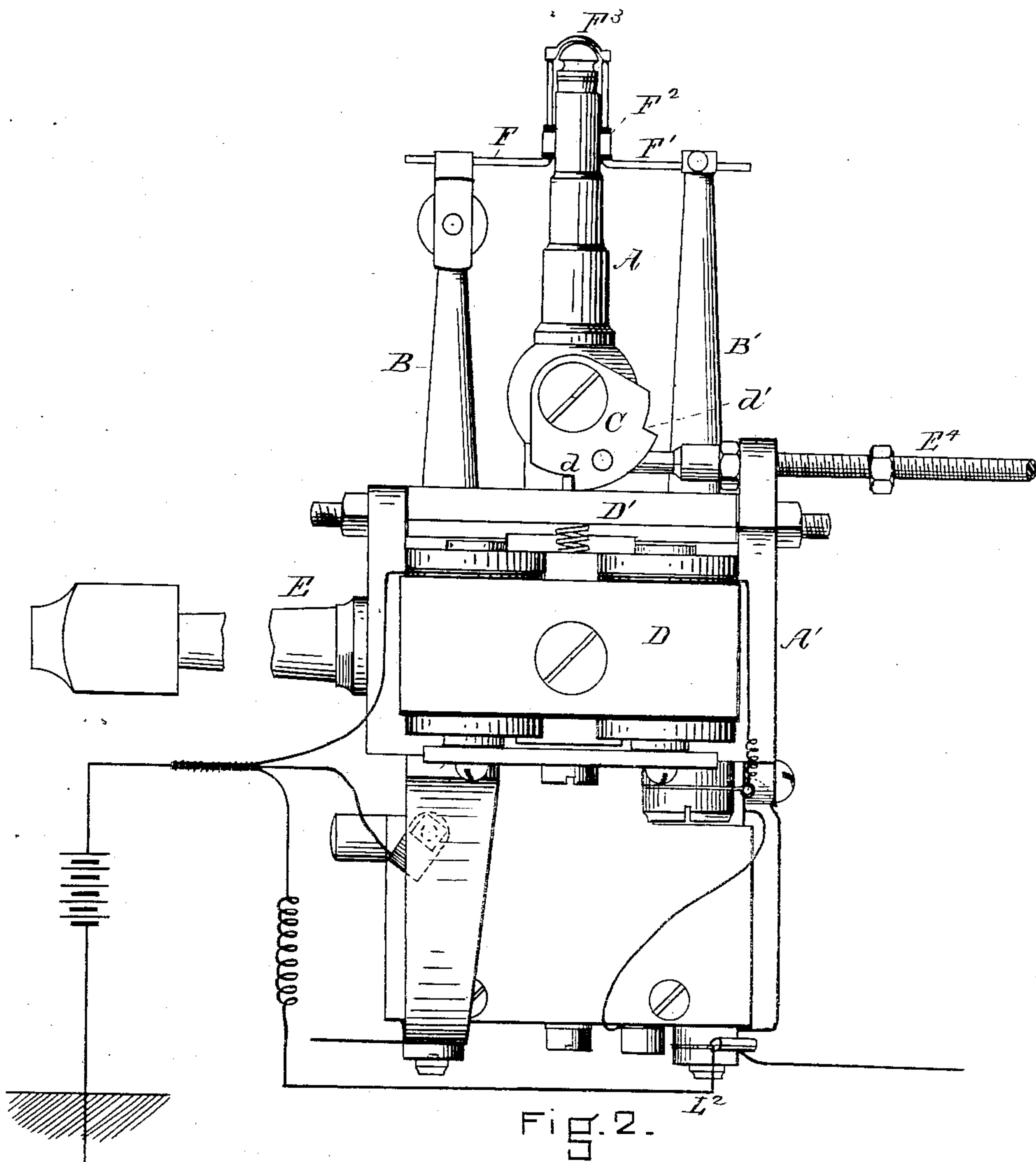
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WITNESSES:

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Helen M. Fugate

INVENTOR:

George D. Bancroft

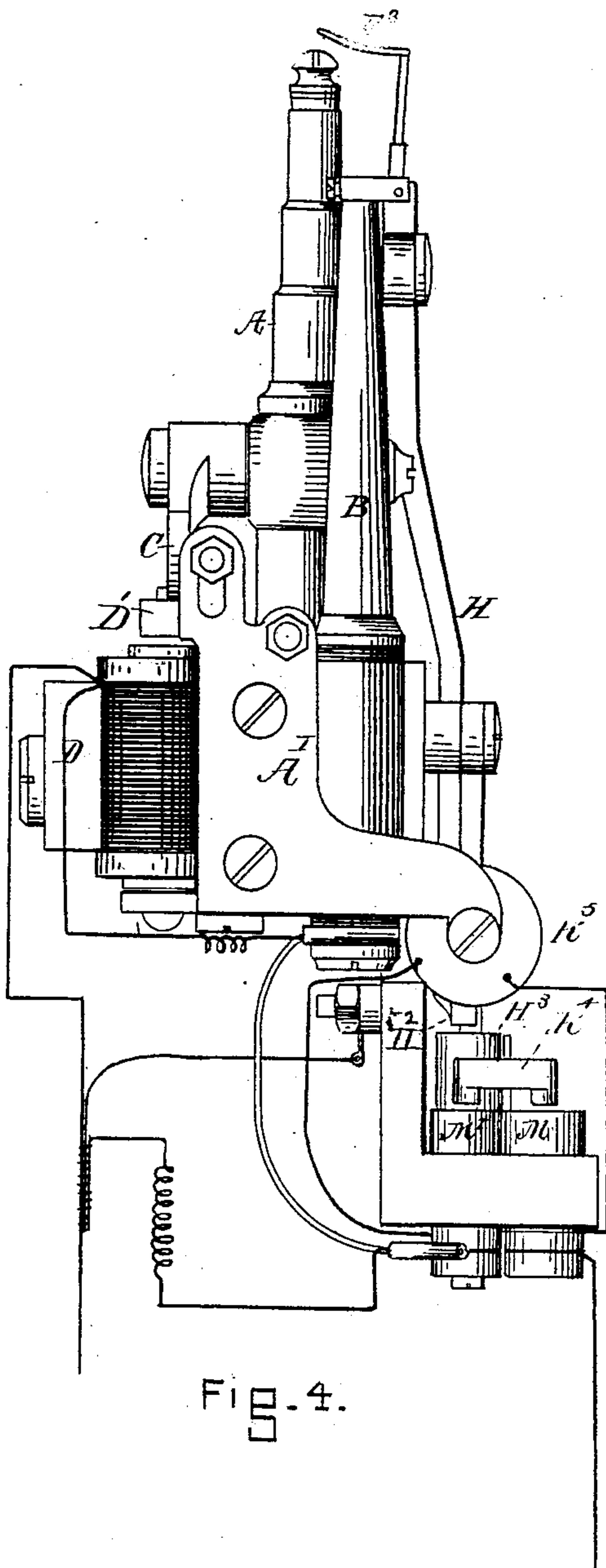
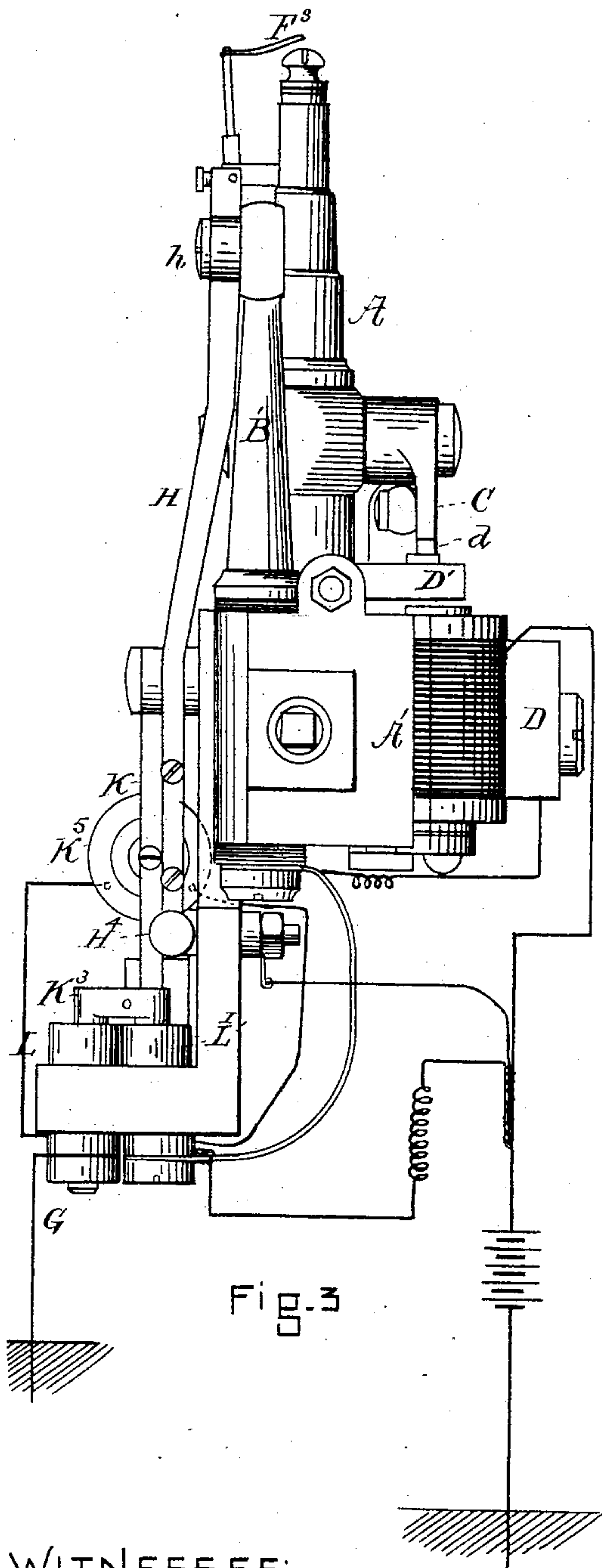
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WITNESSES:

*Frank G. Parker,*  
*Wm. McFugan.*

INVENTOR:

*George D. Bancroft.*

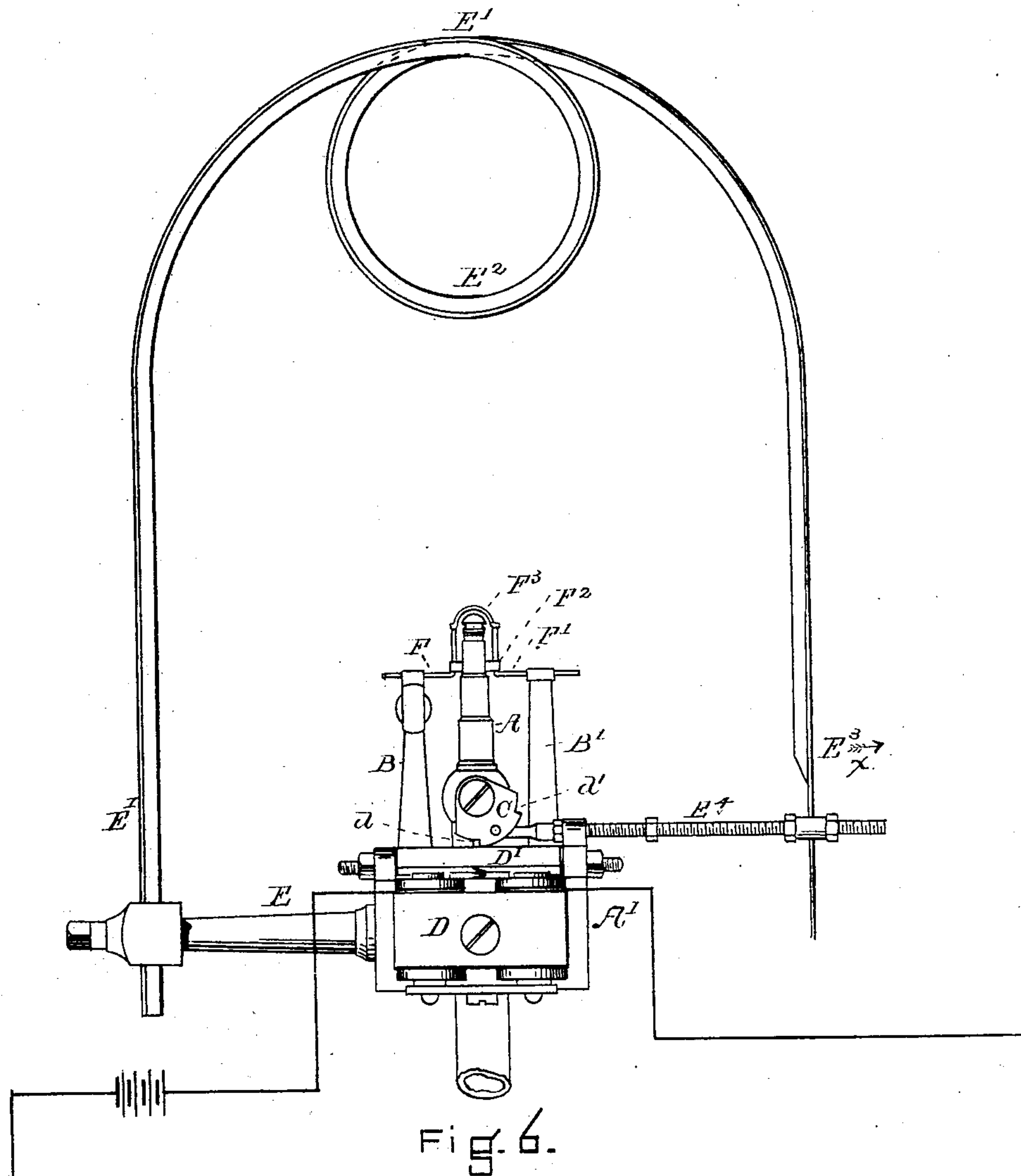
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No. 235,978.

Patented Dec. 28, 1880.



WITNESSES:

Frank S. Parker,  
Helen M. Fregan.

INVENTOR:

George D. Bancroft.



# UNITED STATES PATENT OFFICE.

GEORGE D. BANCROFT, OF BOSTON, MASSACHUSETTS.

## ELECTRIC LIGHTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 235,978, dated December 28, 1880.

Application filed June 7, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE D. BANCROFT, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Electric Gas Controlling and Lighting Apparatus, of which the following is a specification.

My present invention relates to the application of an electric current to the operation of a gas-cock and to lighting the gas-jet by means of an electrically-heated wire; and it consists in the application of an automatic mechanism for transmitting the electric current from one series of gas jets or lamps to another series; also, in minor details, which may be best understood by reference to the specification and drawings.

In the drawings, Figure 1 is a front elevation of the mechanism that I apply to such of the lamps as it is deemed necessary to have transmitters. Fig. 2 is a rear elevation of the same. Figs. 3 and 4 are side elevations of the same. Fig. 5 is a horizontal view of details relating to the transmitting device. Fig. 6 is an elevation of a gas-burner and the device for controlling the flow of gas and lighting the same, this being the device that I use on the greater number of lamps—namely, those upon which no transmitter is necessary.

My invention consists of the combination of a system of apparatus and of the peculiarities of the device. I will first describe the devices and then the system.

In Fig. 6 I have shown the simplest form of the device that is required at each lamp, in which A represents the gas-tip; A', a frame of metal, to which I attach the other parts of the device. D is an electro-magnet, made of any convenient form and size, D' being an armature for the same, the armature D' having a small stud, *d*, on its upper surface, which serves as a check or lock for the segment-arm C. This segment-arm C is attached to the gas-cock and also to the rod E<sup>4</sup>. The turning of the arm C opens or closes the gas-orifice, the stud *d* on the armature locking the same in either position, the armature being thrown up by a spring, so that when there is no electric current to draw it down its tendency is to stay up.

E' E' E<sup>2</sup> E<sup>3</sup> is a compound metallic rod, so made as to have a tendency to straighten when

heated, the end E' being fixed to the arm E. The end E<sup>3</sup> has a tendency, when heated, to move in the direction indicated by the arrow *x*, the parts being so arranged that when the metallic bar E' E' E<sup>2</sup> E<sup>3</sup> is cold and the segment-arm C is locked in the position indicated in Fig. 6 the gas is cut off; but the tendency of the part E<sup>3</sup> is to press firmly in a direction opposite to that indicated by the arrow *x*, so that when the armature D' is brought down by the electric current and the segment-arm C released the gas-cock will be opened by the pressure of the rod E<sup>4</sup>, which is connected to the segment-arm C. When the gas-cock is open the arm C is thrown over, so that the notch *d'* is held by the stud *d* on the armature D'. The gas in burning heats the bar E' E<sup>2</sup> E<sup>3</sup>, and causes it to strain in the direction of the arrow *x*—that is, it has a tendency to close the gas-cock, which it will whenever the armature D' is drawn down. This part of my invention is fully shown and described in the specification and drawings of Letters Patent issued to me June 18, 1878, and numbered 205,032.

The device for lighting consists of the posts B B', the wires F F', and the platinum wire F<sup>3</sup>. When it is desired to light the gas a current of electricity is sent through F<sup>3</sup>, which, being small and of great resistance, becomes so hot as to ignite the gas. The same current that passes through the magnets D and releases the segment-arm C may be used for heating the wire F<sup>3</sup>.

The device for transmitting the electric current from one series of lamps to another is shown in Figs. 1, 3, 4, and 5. As all of the parts are shown in Figs. 1 and 5 it will be understood that these figures are referred to.

H is a lever pivoted at *h* to the post B'. The upper end of this lever H is attached, by the wires F F' and clasp F<sup>2</sup>, to the fixed post B, so that when a current of electricity passes through the wires F and F' they expand and cause the lever H to move, the lower end of the lever moving inward. This action causes the lower end of the lever H to act on the pin *h'* on the lever H', and causes the lever H' to dip its end H<sup>2</sup> into the mercury in the cup H<sup>3</sup>. This action of the lever H' closes a circuit that passes around the magnet K<sup>5</sup> and causes it to draw the armature-lever K in the



direction of the arrow N. The lower end of the lever K engages with arms K', attached to the tilting lever K<sup>2</sup>, and as it moves in the direction of the arrow N, it throws the bridge K<sup>4</sup> of the tilting lever K<sup>2</sup> down into the mercury in the cups M M', and to draw the bridge K<sup>3</sup> of the tilting lever out of the mercury in the cups L L'. This action cuts out the current that has heretofore been passing through the cup L', the bridge K<sup>3</sup>, cup L, and through the system of lamps to which this transmitter belongs, and by uniting the mercury in the cups M M' throws the current over to the next system of lamps. The armature-lever K has a pin, k, which projects over lever H', and acts in such a way on a boss, h<sup>2</sup>, thereon, whenever the armature of lever K is attracted by magnet K<sup>5</sup>, as to hold end H<sup>2</sup> of lever H' down in the mercury of cup H<sup>3</sup>.

In those lamps in the system which are not provided with transmitters the electric current passes around the magnets D and through the posts B B' and wires F F' F<sup>3</sup>.

In the lamps that have the transmitting device, as shown in Figs. 1 and 5, the direct current goes through the cups L L' and bridge K<sup>3</sup>, through the magnets D, (see Fig. 3,) and the lighting-wire F<sup>3</sup>, with the divided current which passes through the magnet K', when the lever H' H<sup>2</sup> is thrown into the mercury-cup H<sup>3</sup>; but both of the currents are cut off when the bridge K<sup>3</sup> is raised out of the mercury in the cups L L', in which case the current is connected by the bridge K<sup>4</sup>, so as to pass on to the next system of lamps.

My system complete consists of the dynamo-electric generator, an electric circuit, and a series of lamps, like those shown in Fig. 6, terminating in a lamp having a transmitter, as shown in Fig. 1, then another series of lamps, like the one shown in Fig. 6.

The device shown in Fig. 6 is for all of the lamps in each system, except the end lamp, which has attached to it the transmitting device shown in Figs. 1 and 5.

The number of lamps in system may vary from five to fifty, according to circumstances.

With a strong dynamic generator I think it is practical to unite as many as fifty lamps in a single circuit, as my device for opening the gas-cocks and lighting admits of an unbroken current.

I do not claim herein, broadly, means for automatically cutting the lighting-wire out of circuit, as means to that end are included in an application for United States Letters Patent filed by me April 23, 1880.

Having thus described my invention, what I desire to secure by Letters Patent is—

1. In a system of gas-lamps lighted by electricity, the combination of a series of devices consisting of the thermo-bar E' E<sup>2</sup> E<sup>3</sup> and the stop-cock C and a lighting device, F F' F<sup>3</sup>, with a terminal transmitting device for shifting the current to the next lamp, substantially as described, and for the purpose set forth.

2. In an electric lighting device, the combination of the wires F F' and clasp F<sup>2</sup> with the levers H H' and mercury-cup H<sup>3</sup>, operating together substantially as described, and for the purpose set forth.

3. In an electric lighting device, the combination of the magnet K<sup>3</sup> and the armature-lever K with the lever H' H<sup>2</sup>, mercury-cup H<sup>3</sup>, the tilting lever K<sup>2</sup>, its bridges K<sup>3</sup> K<sup>4</sup>, and the mercury-cups L L' M M', all operating together substantially as described, and for the purpose set forth.

GEORGE D. BANCROFT.

Witnesses:

HELEN M. FEEGAN,  
S. A. OTIS.