

(No Model.)

H. A. PINKHAM.
ELECTRIC GAS LIGHTING BURNER.

No. 470,256.

Patented Mar. 8. 1892.

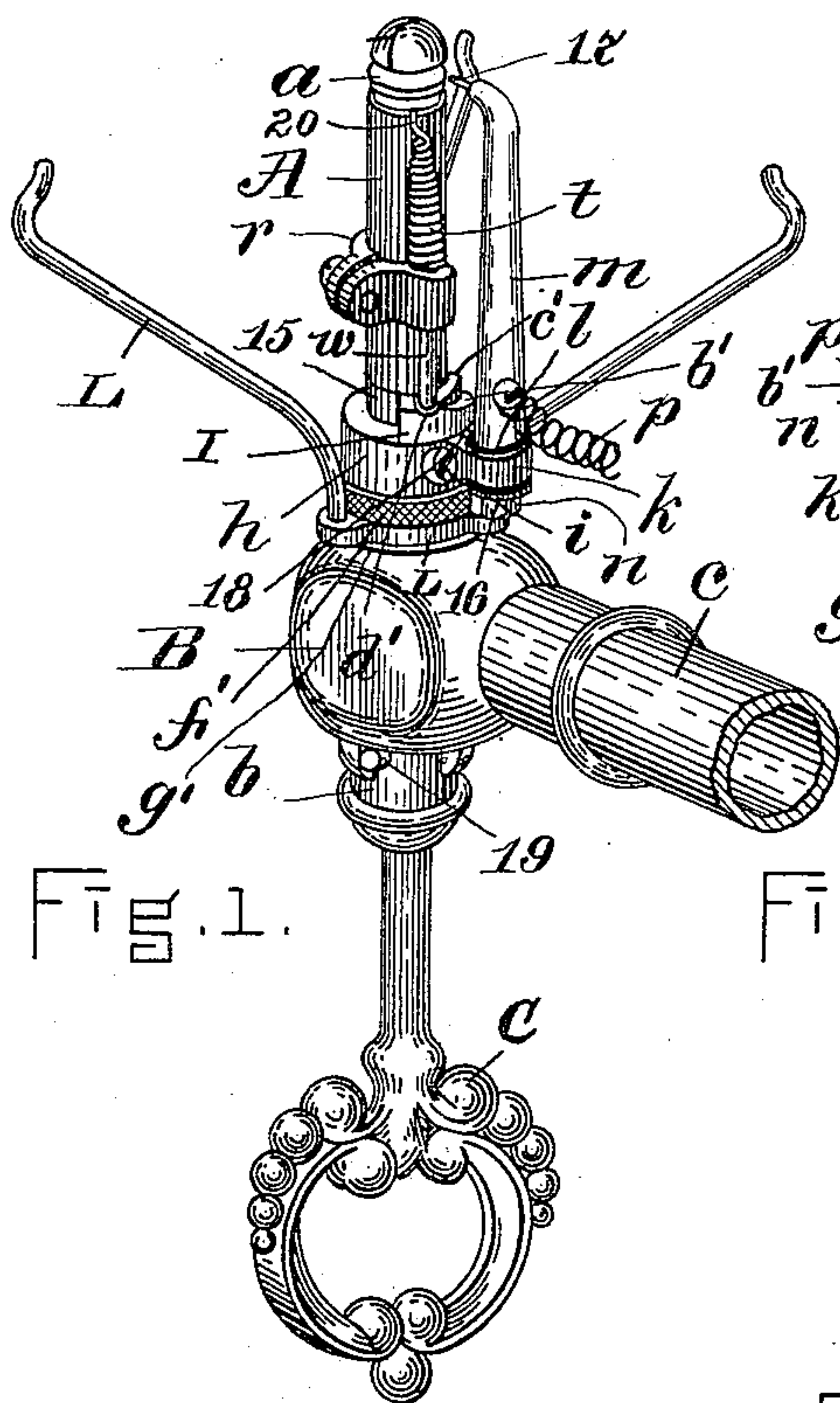


Fig. 1.

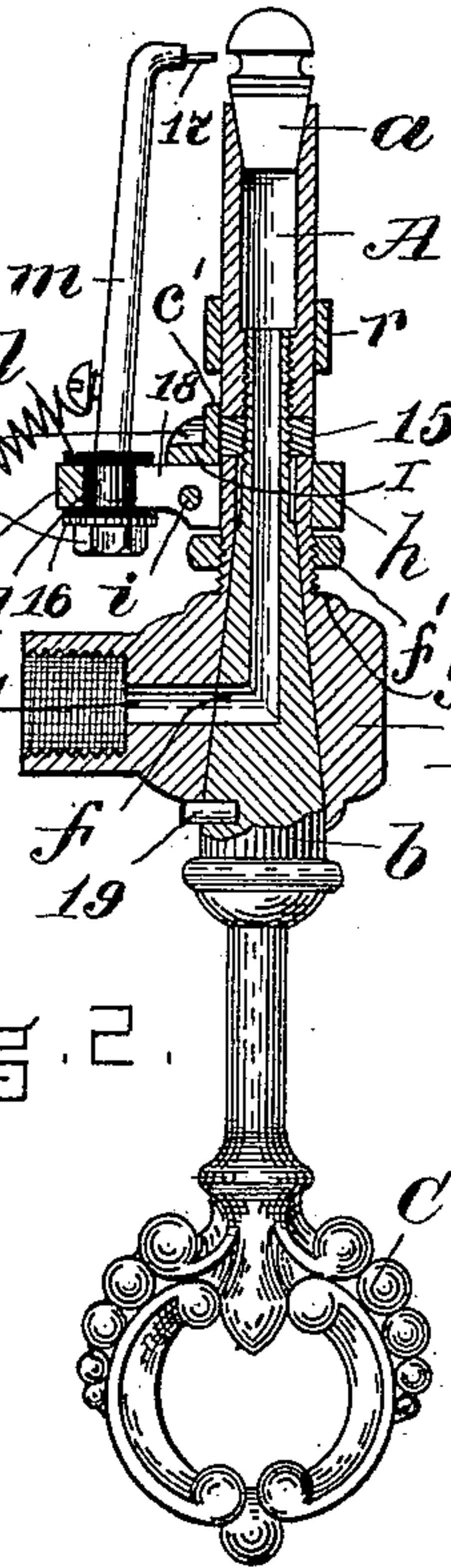


Fig. 2.

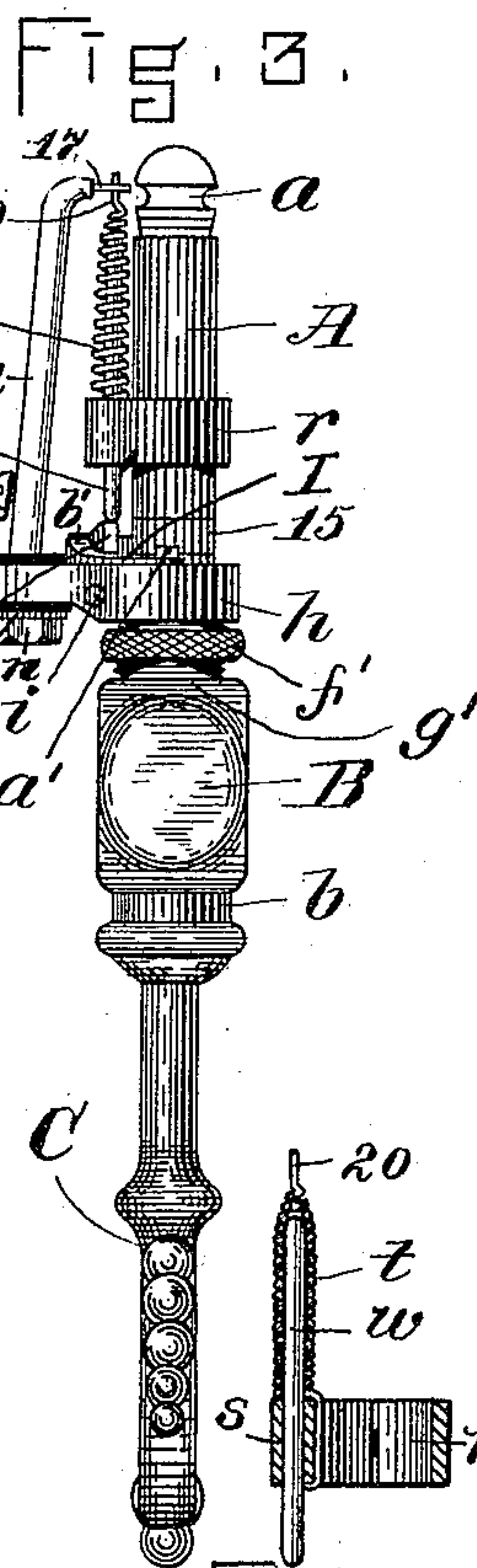


Fig. 3.

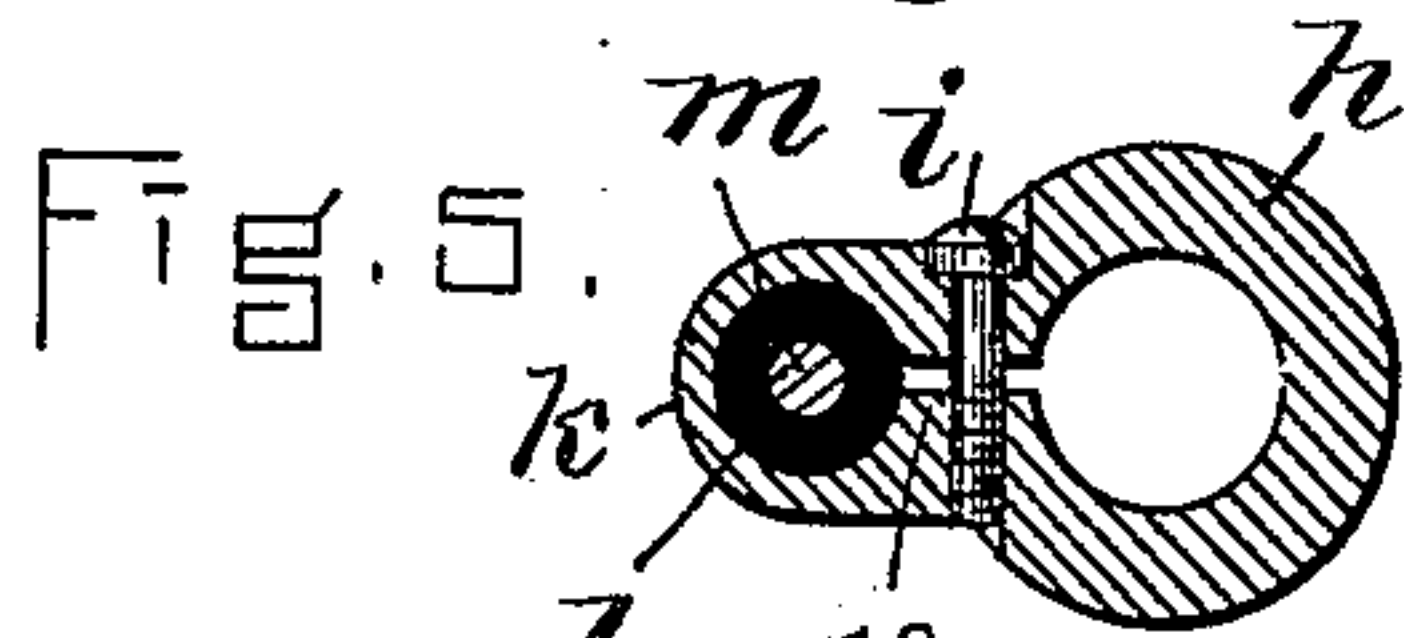


Fig. 5.

Fig. 4.

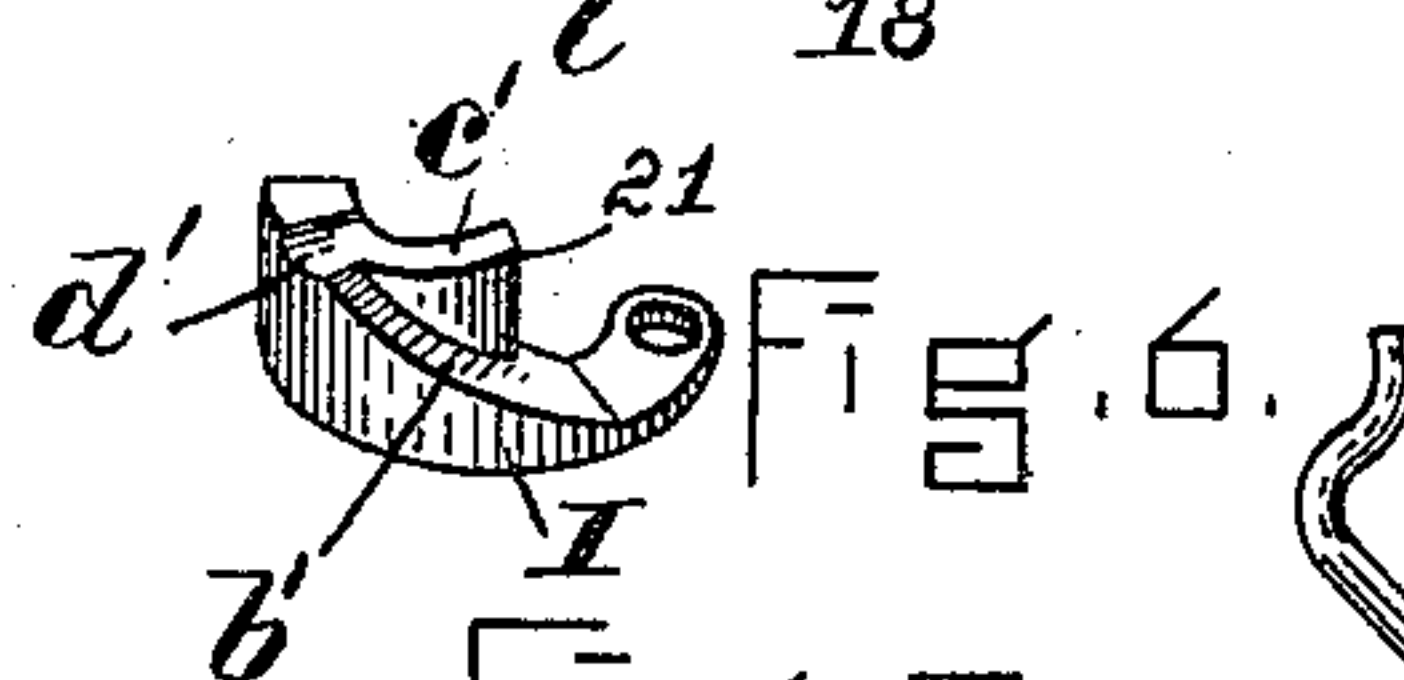


Fig. 6.

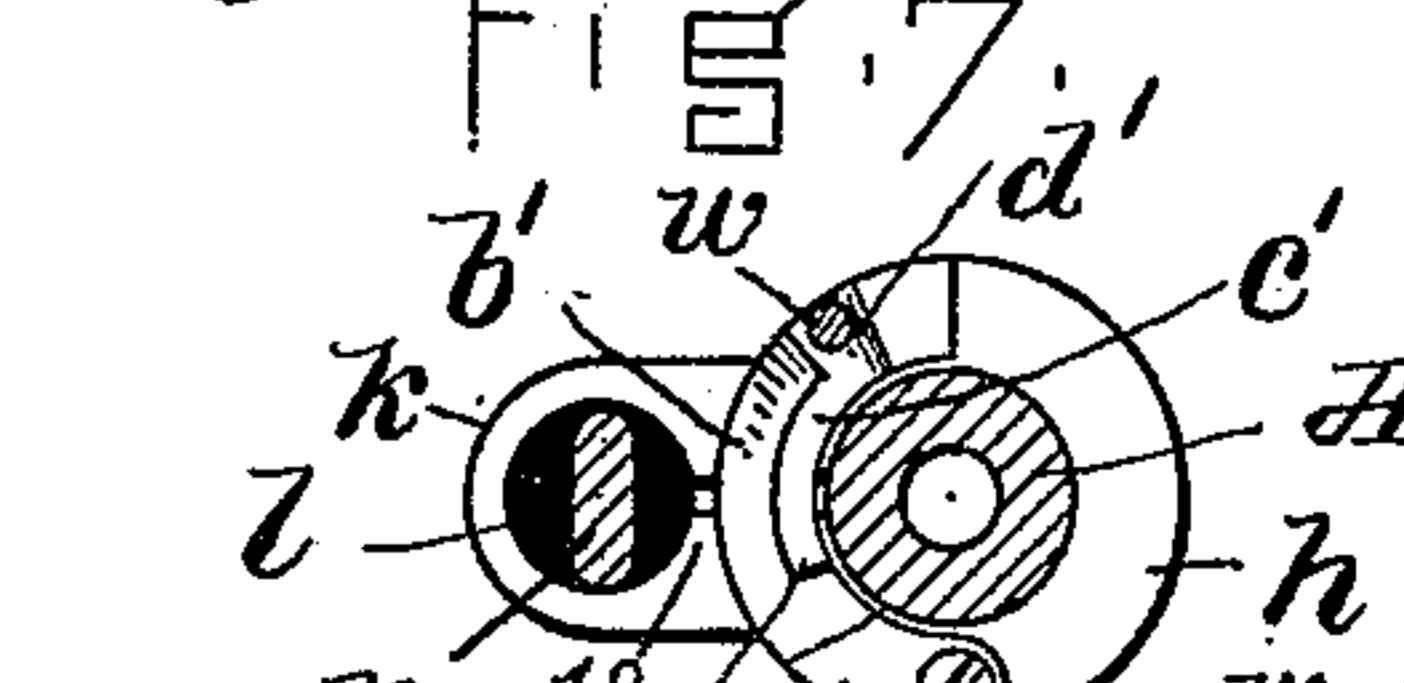


Fig. 7.

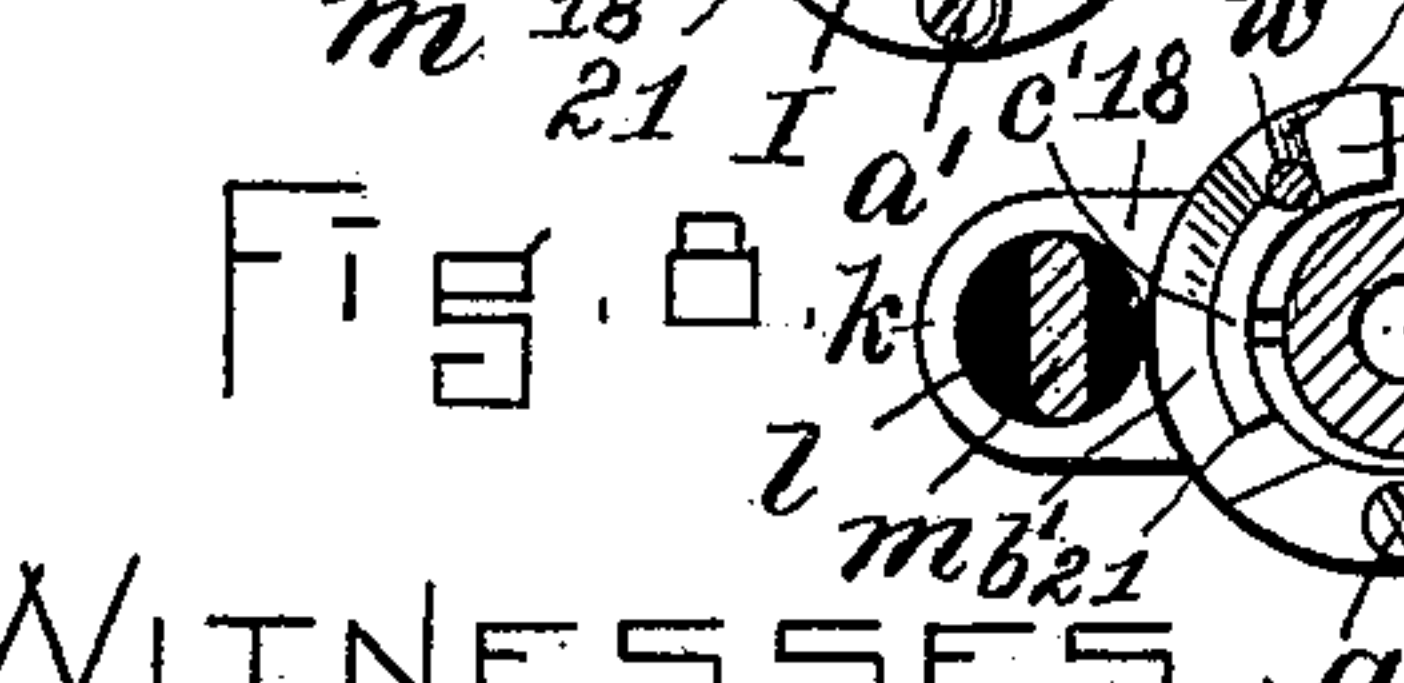


Fig. 8.

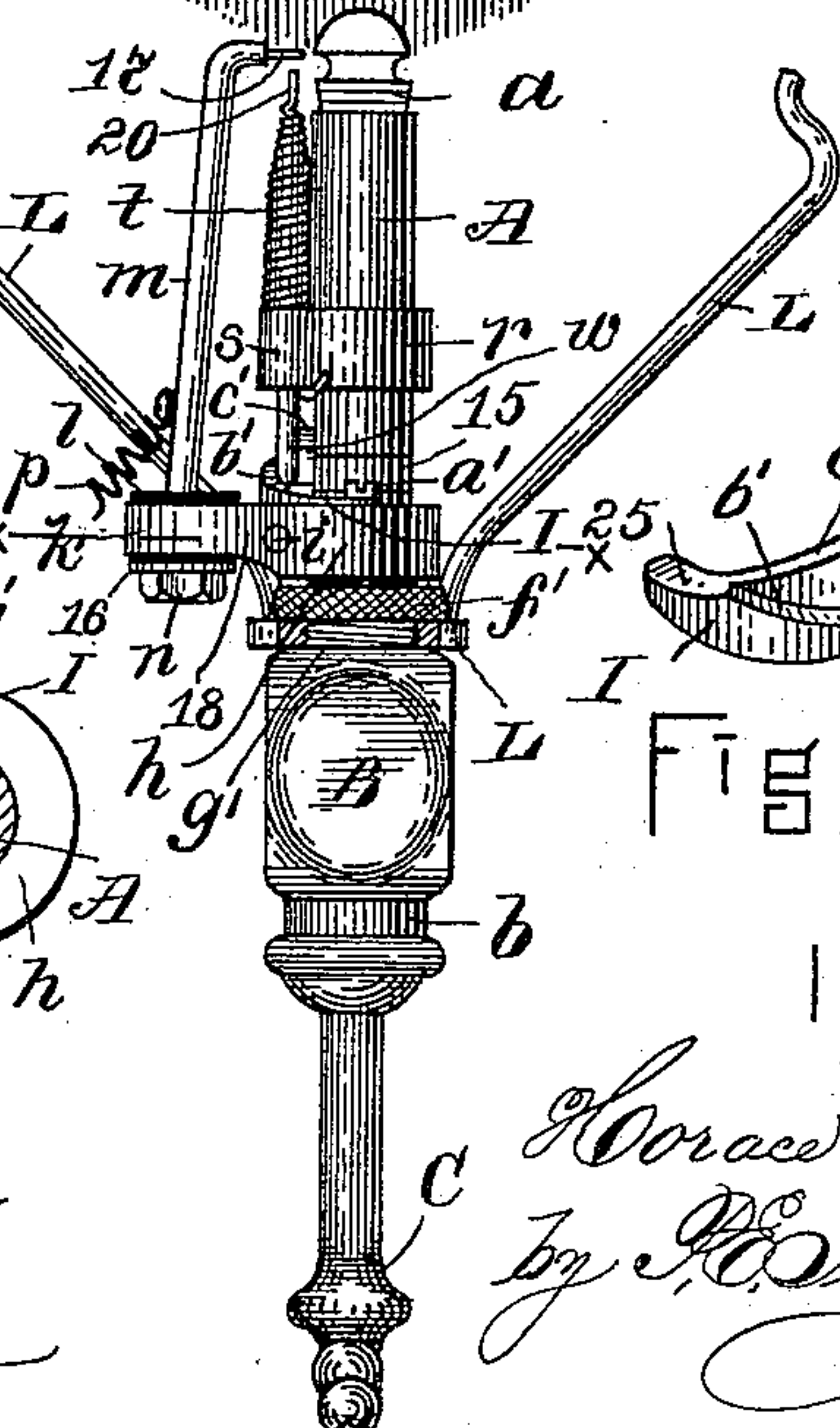


Fig. 9.

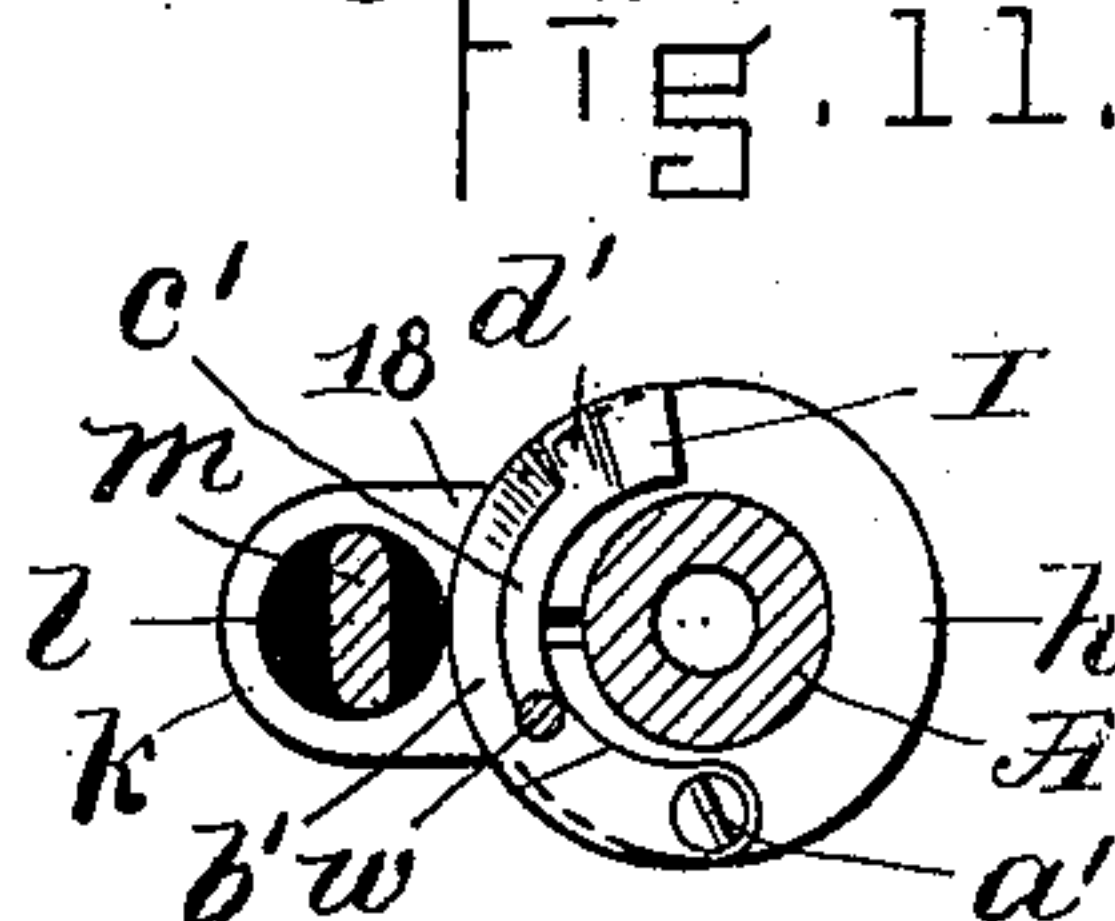


Fig. 10.

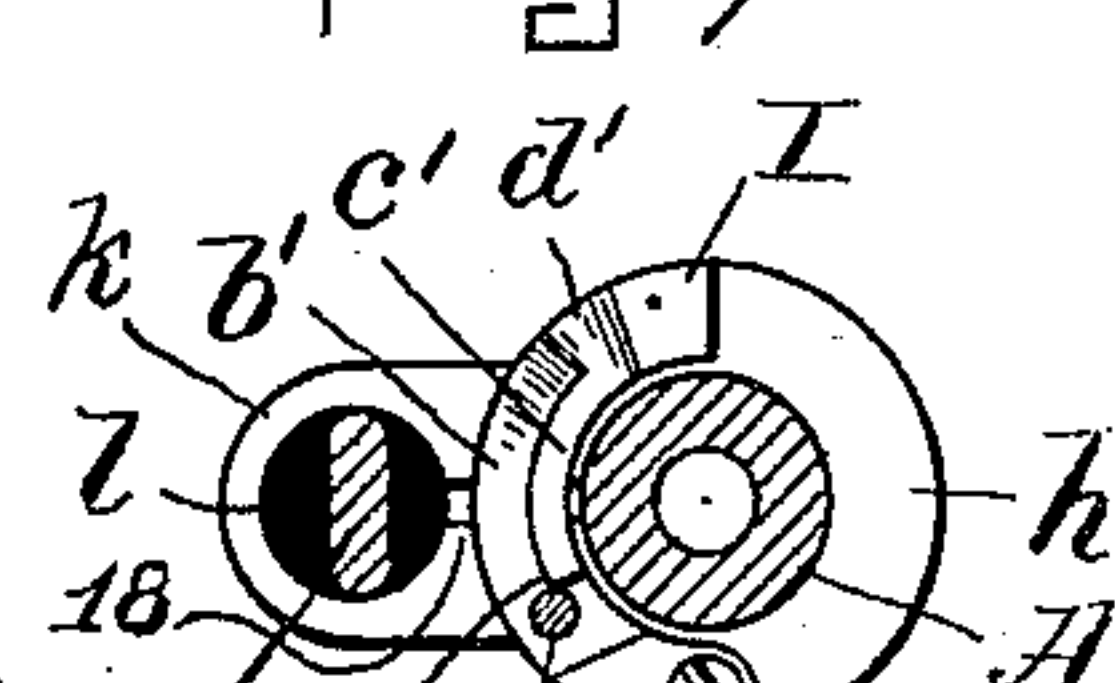


Fig. 11.

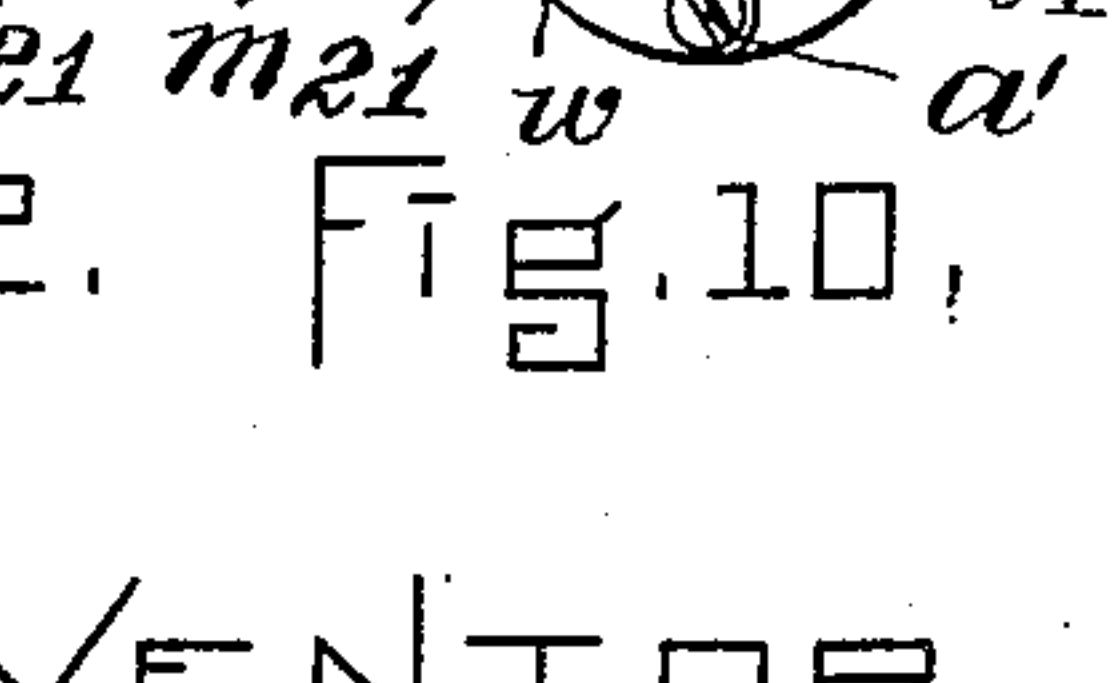


Fig. 12.

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UNITED STATES PATENT OFFICE.

HORACE A. PINKHAM, OF WOLLASTON, MASSACHUSETTS, ASSIGNOR TO
GEORGE F. PINKHAM, OF SAME PLACE.

ELECTRIC GAS-LIGHTING BURNER.

SPECIFICATION forming part of Letters Patent No. 470,256, dated March 8, 1892.

Application filed September 25, 1891. Serial No. 406,846. (No model.)

To all whom it may concern:

Be it known that I, HORACE A. PINKHAM, a citizen of the United States, residing at Wollaston, in the county of Norfolk and State of Massachusetts, have invented certain Improvements in Electric Gas-Lighting Burners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of an electric gas-lighting burner constructed in accordance with my invention, the stop-cock being closed. Fig. 2 is a vertical section through the center of the same, the stop-cock being open. Fig. 3 is a side elevation of the same, the electrodes being represented in contact with each other. Fig. 4 is a side elevation of the same with the stop-cock open. Fig. 5 is a horizontal section on the line $x x$ of Fig. 4. Fig. 6 is a perspective view of the cam which actuates the movable electrode; Figs. 7, 8, 9, and 10, details to be referred to. Fig. 11 is a vertical section of the movable electrode and its guide. Fig. 12 represents a modification to be referred to.

This invention relates to certain improvements on the electric gas-lighting burner for which Letters Patent of the United States No. 458,486 were granted to me August 25, 1891, the object of the present invention being to render the lighting device more durable, reliable, and positive in its action, and at the same time avoid the liability of its getting out of order.

To this end my invention consists in the combination, with the movable electrode, of a cam of novel construction for actuating the same, as hereinafter more fully set forth.

In the said drawings, A represents the hollow pillar or main vertical portion of the gas-burner, which is provided, as usual, with a tip a and forms a prolongation or upward extension of the tapering plug b of the stop-cock, which is arranged vertically within the shell B, on one side of which is the supply-pipe c . The pillar A is screwed onto the upper threaded end of the plug b , as seen in Fig. 2, and a check-nut 15, also placed upon said threaded end, is interposed between the

bottom of the pillar A and the upper end of the shell B, resting upon the latter and serving to hold the tapering plug b firmly up within its seat, thus preventing leakage, the pillar A being screwed down firmly upon said nut to lock it securely in place when adjusted. The stem of the plug b extends down below the shell B and has formed upon its lower end or attached thereto in any suitable manner a thumb-piece or handle C, by which it can be turned by the hand to let on or shut off the gas, a suitable stop-pin 19 being provided, as usual, to limit the movement of the plug in either direction. The plug b is made hollow and communicates with the straight longitudinal passage through the pillar or vertical portion A of the burner, and in the side of the plug is formed an aperture f , which communicates with its interior and is so placed that by turning the plug it can be brought into or out of line with the gas-inlet passage g to admit the gas to the portion A or shut it off therefrom, as required.

Around the upper portion of the shell B is fitted a heavy collar h , which is clamped tightly in place by a screw i , said collar having on one side an enlargement or projecting portion k , provided with a vertical aperture, within which is placed a sleeve or bushing l , composed of hard rubber or other suitable insulating substance, for the reception of the lower end of the fixed electrode m , which is secured in place by a nut n and washer 16. The upper end 17 of this electrode, which is bent at a right angle, as shown, extends up to a point in close proximity with the orifice at the tip of the burner, and said electrode is connected, as usual, with one pole of the battery by a wire p . The collar h is made in a single piece without being slit or cut through to the outside at any point, and after the larger and smaller apertures therein have been smoothed or bored out the solid portion 18, between them is sawed or cut through, whereby sufficient spring or elasticity is afforded to enable the collar to be tightly clamped in place by means of the screw i , and the necessity of cutting the collar through to the outside is thus avoided and a neater finish thereby secured.

To the vertical portion or pillar A, which, as before stated, is turned or rotated with the stop-cock by means of its key or handle C, is clamped above the collar *h* a collar *r*, which is provided on one side with a vertical aperture *s*, forming a guide for a vertically-sliding pin or rod *w*, which is encircled by a light spiral spring *t*, which forms the upper portion of the movable electrode and is connected through the burner and the gas-pipe with the other pole of the battery. The lower end of this spring *t* is secured to the collar *r*, and the upper portion, which is of slightly reduced diameter and of conical form at the top, extends some little distance above the top of the pin *w*, which latter extends up into the upper portion of the spring as far as permitted by its closed conical end, the terminal of the spring *t* consisting of a straight vertical piece of wire 20, the elasticity of which permits it to be wiped or swept past the rigid terminal 17 of the fixed electrode, thus producing a spark to ignite the gas.

The parts thus far referred to are substantially the same as described in my aforesaid Letters Patent No. 458,486, and form no part of my present invention.

The pin *w* is raised against the influence of the spring *t* by a curved cam I, which partially encircles the pillar A and is secured to the upper side of the collar *h* by a screw *a'*, which forms a pivot, upon which said cam is free to swing horizontally toward and from the pillar A its outward swing being limited by the insulating-bushing *l* of the fixed electrode *m*, which forms a stop therefor. This cam, which lies in the path traveled by the rod *w* when swung around by the movement of the pillar A in the operation of letting on or shutting off the gas, is provided with two inclines *b'c'*, both extending upward, but in opposite directions, the incline *b'* being on the outer side of the cam and the incline *c'* on the inner side, next to the pillar A. The highest portion of the incline *b'* is on a level with the lowest portion of the incline *c'*, and at the junction of these two inclines is formed a semicircular notch or depression *d'*, within which, close to the outer edge of the cam, lies the bottom of the pin *w* when the parts are in their normal position with the gas shut off, as seen in Figs. 1 and 7, the spring *t* holding the end of the rod *w* in place within the notch *d'*. As soon as the pillar A commences to be swung around by the handle C in the operation of letting on the gas the lower end of the rod *w*, held down by its spring acting on the side of the notch *d'*, swings the cam I outward on its pivot *a'* until it comes into contact with its stop *l*, as seen in Figs. 8 and 9. This outward movement of the free end of the cam I brings its inner and upper incline *c'* into the path of the lower end of the rod *w*, as seen in Fig. 8, which as it continues to move around with the pillar A is caused to travel up the incline *c'*, whereby said rod is forced up through its guide *s*, producing an

upward movement of the spring *t*, forming the upper portion of the movable electrode, the terminal 20 of which is thereby raised above the level of the horizontal terminal of the fixed electrode, as seen in Fig. 3. As the vertical portion A of the burner continues to be rotated with the stop-cock the elastic terminal 20 is brought into contact with the terminal 17 of the fixed electrode, as seen in Fig. 3, and wiped past the same, thus producing the spark to ignite the gas, the cock being open to let on the gas when the parts are in this position. The separation of the terminals 17 20 occurs at the instant when the end of the rod *w* is carried past and drops off the end or highest point of the incline *c'* of the cam I, the resiliency of the spring *t* carrying the rod *w* back to its lowest level and causing its lower end to strike the incline *b'* near its lowest point, the force of the blow thus struck, combined with the forward impulse produced by the slipping of the rounded bottom of the rod *w* off the sharp corner of the incline *c'*, causing the cam I to be swung inward on its pivot, and thus bringing the portion of the incline *b'* outside the incline *c'* into the path of the rod *w*, as seen in Fig. 10. In this position the terminal 20 will be entirely out of the way of the flame, as is necessary to prevent it from being injured thereby, and when the stop-cock is rotated in the opposite direction to shut off the gas the lower end of the rod *w* is caused to travel up the incline *b'* outside the incline *c'* until it reaches and drops into the notch *d'*, as seen in Figs. 1 and 7, the gas being then shut off and the parts being in a position to be operated, as before described, when the gas is to be again lighted. During the return movement of the movable electrode it will be raised half-way as the rod *w* travels up the incline *b'*, but not sufficiently to cause it to be brought into contact with the fixed electrode. Consequently there will be no contact between the two while the gas is being shut off, no spark being required at that time. The pin *w*, being round, will, as it travels upon the incline *b'*, readily slip past the corner 21 of the inclined portion *c'* of the cam I; but this corner may be slightly rounded off, if desired, to reduce friction. If preferred, the notch *d'* on the cam I may be dispensed with and the end of the cam beveled off, as seen at 25 in Fig. 12, said bevel forming a downward continuation of the upper incline *c'*. With this construction the lower end of the rod *w* acts on the bevel 25 in the same manner as it does on the notch *d'* and swings the cam outward on its pivot in a similar manner, the bevel being the full mechanical equivalent of the notch *d'* first described and producing the same result. The upper portion of the shell B beneath the collar *h* is provided with a screw-thread, on which turns a nut *f'*, between which and the shoulder *g'* is clamped the shade-holder L, which is thus held securely in place, as desired.

The above-described cam is simple, posi-

tive, and reliable in its action, and an electric gas-lighting burner constructed as above described is not liable to get out of order and is much safer than those in which the gas-cock is operated by pulling down a pendent cord or chain, for the reason that the position of the key or handle will always indicate whether the gas is let on or shut off, which is not the case with the class of burners known as "pendent burners." Hence there is no liability of the parts being left in a position to allow the gas to escape. Furthermore, there is no liability of the electrodes being left in contact with each other, as the turning of the gas-cock to let on the gas is sure to separate them, while no contact is made on the return movement of the gas-cock to shut off the gas.

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

1. In an electric gas-lighting burner, the combination, with the fixed electrode and a movable electrode, of a cam for actuating said movable electrode, said cam having two inclines, one outside the other, extending upward in opposite directions and adapted to act alternately upon said movable electrode, substantially as set forth.

2. In an electric gas-lighting burner, the combination, with the fixed electrode and a movable electrode actuated in one direction by a spring, of a cam for actuating said movable electrode against the influence of its spring, said cam having two inclines, one outside the other, extending upward in opposite directions and adapted to act alternately upon said movable electrode, substantially as set forth.

3. In an electric gas-lighting burner, the combination, with the fixed electrode and a vertically-movable electrode actuated in one direction by a spring, of a cam for raising said movable electrode against the influence of its spring, said cam having two inclines *b' c'*, extending upward in opposite directions and located one outside the other, and a notch or depression at the junction of the two inclines, said inclines acting one to partially raise the movable electrode as the gas is shut

off and the other to complete the upward movement of said electrode as the gas is let on, substantially as described.

4. In an electric gas-lighting burner, the combination, with the fixed electrode and a movable electrode actuated in one direction by a spring, of a horizontally-swinging cam pivoted at one end and adapted to actuate said movable electrode against the influence of its spring, said cam having two inclines *b' c'*, extending upward in opposite directions and located one outside the other, and a notch or depression at the junction of the said two inclines for the reception of the lower end of the movable electrode, whereby said cam is swung outward on its pivot to bring its upper incline into the path of the movable electrode and swung inward as the said electrode drops off the end of the said upper incline to bring the lower incline into the path of the movable electrode, substantially as set forth.

5. In an electric gas-lighting burner, the combination, with the plug of the stop-cock arranged vertically within the shell and provided with a thumb-piece or handle, and the pillar or vertical portion A, forming a prolongation or upward extension of the said plug, of a fixed electrode and a movable electrode consisting of a pin or rod having a suitable terminal and sliding within a guide attached to and adapted to be rotated with the portion A, a cam for raising said rod as its lower end is caused to travel in contact therewith by the rotation of the said portion A to carry its terminal above the level of the terminal of the fixed electrode, said cam having two inclines, one outside the other, extending upward in opposite directions and adapted to act alternately upon said rod, and a spring for retracting the rod after it has passed off the end of the upper incline of the cam, substantially as described.

Witness my hand this 23d day of September, A. D. 1891.

HORACE A. PINKHAM.

In presence of—

P. E. TESCHEMACHER,

L. M. PALMER.