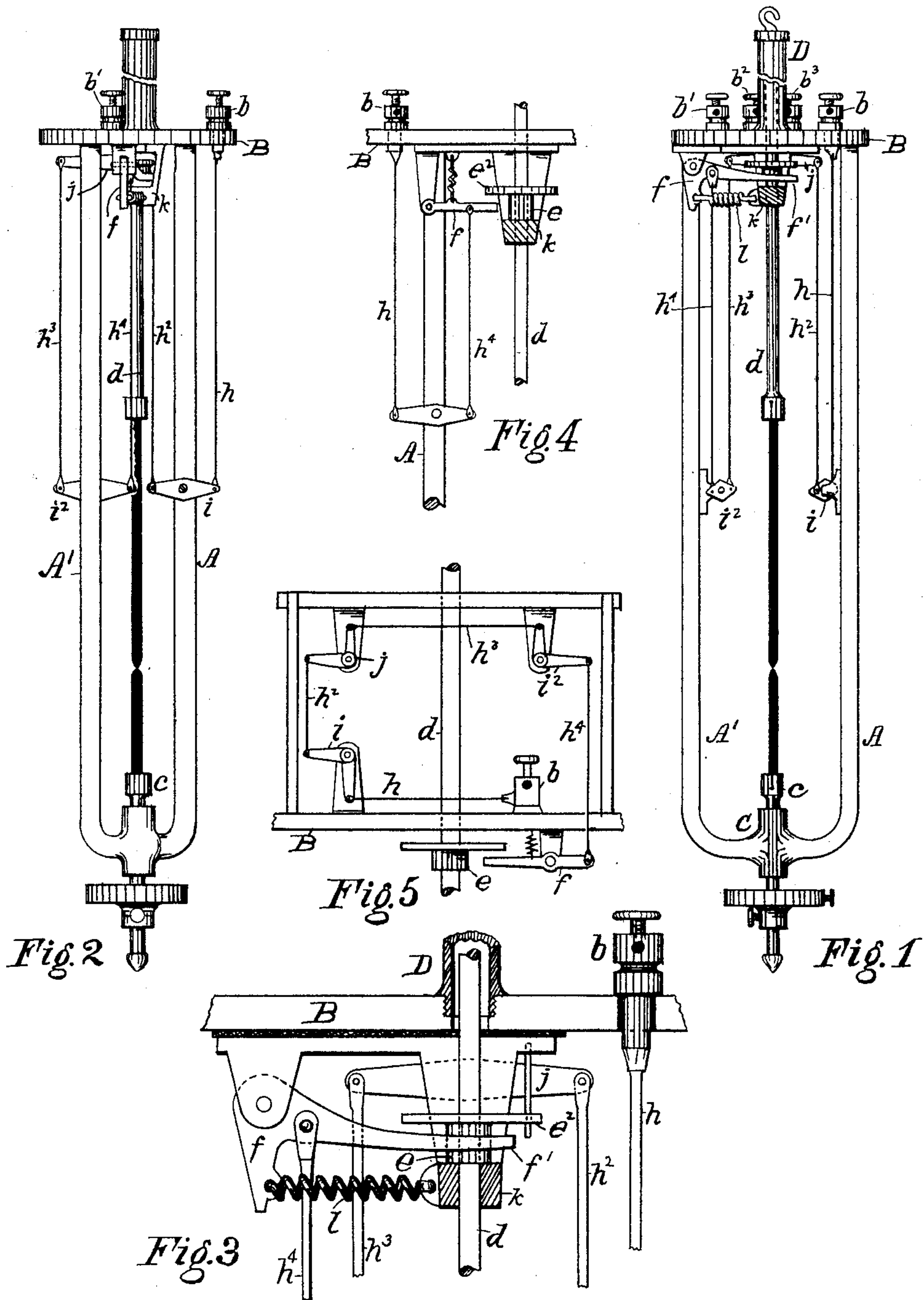


(No Model.)

J. MUELLER.
ELECTRIC ARC LAMP.

No. 602,404.

Patented Apr. 12, 1898.



Witnesses
L. J. Randall.
John Buntiss

John Mueller Inventor

By his Attorney

C. M. Vorce

UNITED STATES PATENT OFFICE.

JOHN MUELLER, OF CLEVELAND, OHIO, ASSIGNOR TO THE DUPLEX HANGER COMPANY, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 602,404, dated April 12, 1898.

Application filed August 27, 1897. Serial No. 649,672. (No model.)

To all whom it may concern:

Be it known that I, JOHN MUELLER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Arc-Lamps; 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.

My invention relates to improvements in electric-arc lamps.

The object of the invention is to increase the efficiency of the lamp; and it consists in the novel features of construction, combination, and arrangement of parts hereinafter fully described, and specifically pointed out in the claim.

In the drawings, Figure 1 is a view in elevation of an electric-arc lamp constructed according to my invention, and Fig. 2 is a like view of the lamp taken at right angles to the view shown in Fig. 1. Fig. 3 is a detail showing, on a larger scale, the feed-clamp and its connections, &c.; and Figs. 4 and 5 show variations of the arrangement of the strips.

In electric-arc lamps wherein the feeding-clamp which lifts the upper carbon is actuated by the expansion and contraction of a thermo-expansive conductor or by the joint action of such conductor and a spring there has been experienced great difficulty in securing at the same time sufficient delicacy of action and a sufficient extent of movement, owing to the limitations in the size of the lamps, which are, for commercial reasons, necessary. Attempts have been made to meet this difficulty by causing such thermo-expansive strip to act upon the short arm of a lever and to multiply the movement of this arm by giving the other arm an increased length; but this method multiplies the resistance also and has proven, in practice, to be objectionable, as have all other attempts to overcome this difficulty.

By the construction shown I have, after much experimenting, finally overcome the difficulty.

In the drawings, A A' are the side bars of the ordinary lamp-frame and are joined at

the top by the upper plate B, with which they may be integral, and at the bottom are united by the collar C, through which passes the holder *c* for the lower carbon.

D is a tube in which slides the holder *d* for the upper carbon, and on which holder is the usual clamp *e*, fitted to slide smoothly thereon and provided with a projecting rim or arm *e*², with which the lifting-lever *f* engages to lift the clamp and holder, as hereinafter described.

The top plate B is provided with the usual binding-posts *b b'*, insulated therefrom, to which the main circuit is connected, and may also be provided with binding-posts or connections for any rheostat or shunt connections desired, as *b*² *b*³. The lower carbon is connected, as by conductor *o*, to the post *b'*. To the lower part of post *b* is joined one end of a thermo-expansive strip *h*, whose other end is connected to one arm of a lever *i*, pivotally supported on, but insulated from, the lamp-frame. A similar expansive strip *h*² joins the other end of lever *i* to one end of a cross-lever *j*, pivoted on, but insulated from, the frame. To the other end of lever *j* a third expansive strip *h*³ is connected and joined to one end of a lever *i*², also pivoted to, but insulated from, the lamp-frame, and the other end of lever *i*² is joined by a fourth expansive strip *h*⁴ to the lifting-lever *f*, pivoted on, but insulated from, the frame. A spring *l* actuates the lever *f* in such manner as to lift its free end *f'*, which is adapted to engage the arm or collar *e*² of clamp *e*.

The strips *h h*² *h*³ *h*⁴ and levers *i*, *i*², and *j* are so proportioned that when cold the free arm *f'* of lever *f* will be depressed against the tension of spring *l*, so as to allow clamp *e* to rest upon a fixed stop, as *k*, and consequently the upper-carbon holder will by its gravity slide downward until the carbon rests upon the lower carbon. If current is now turned on, it will pass through the strips *h h*² *h*³ *h*⁴ and their connecting-levers to the holder *d* and through the carbons, and will by its passage heat and expand the strips *h h*² *h*³ *h*⁴, which will allow the spring *l* to lift the arm *f'* into contact with the rim *e*², and as arm *f'* continues to lift it will tilt the clamp *e* and cause it to lift the upper carbon, thus forming the arc.

As the increased resistance diminishes the quantity of current passing the strips $h h^2$, &c., contract and draw down the arm f' , thus allowing the carbon to descend and shorten the arc, whereupon the current through the expansive strips increases and expands them again, and thus the alternate expansions and contractions feed the carbon down steadily, so as to maintain an almost constant resistance at the arc, and hence a steady light without flickering or hissing. So great is the sensitiveness of this device that one-third of the current will operate it which is required to operate the feed with a single expansive strip.

By the construction shown I obtain more than four times the length of expansive strip which is possible with a single strip, and I obtain a perfect regulation of the arc, which has been found by repeated trials to be impossible with the single strip.

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

In an arc-lamp the combination with the carbon-holding devices and a feeding-clamp having sliding engagement with the upper-carbon holder, of a lifting-lever adapted to engage and lift said clamp, a spring acting on said lever to cause it to engage said clamp, a cross-lever pivoted on the lamp-frame, auxiliary levers as $i i^2$, and thermo-expansive strips connecting the auxiliary levers respectively with the cross-lever and the lifting-lever, and with the cross-lever and a binding-post to which the main circuit is connected, substantially as described.

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

JOHN MUELLER.

Witnesses:

L. J. RANDALL,
LOREN PRENTISS.