(No Model.)

B. B. WARD.

ALTERNATING CURRENT ARC LAMP.

No. 473,536. Patented Apr. 26, 1892.

Fig. 1.

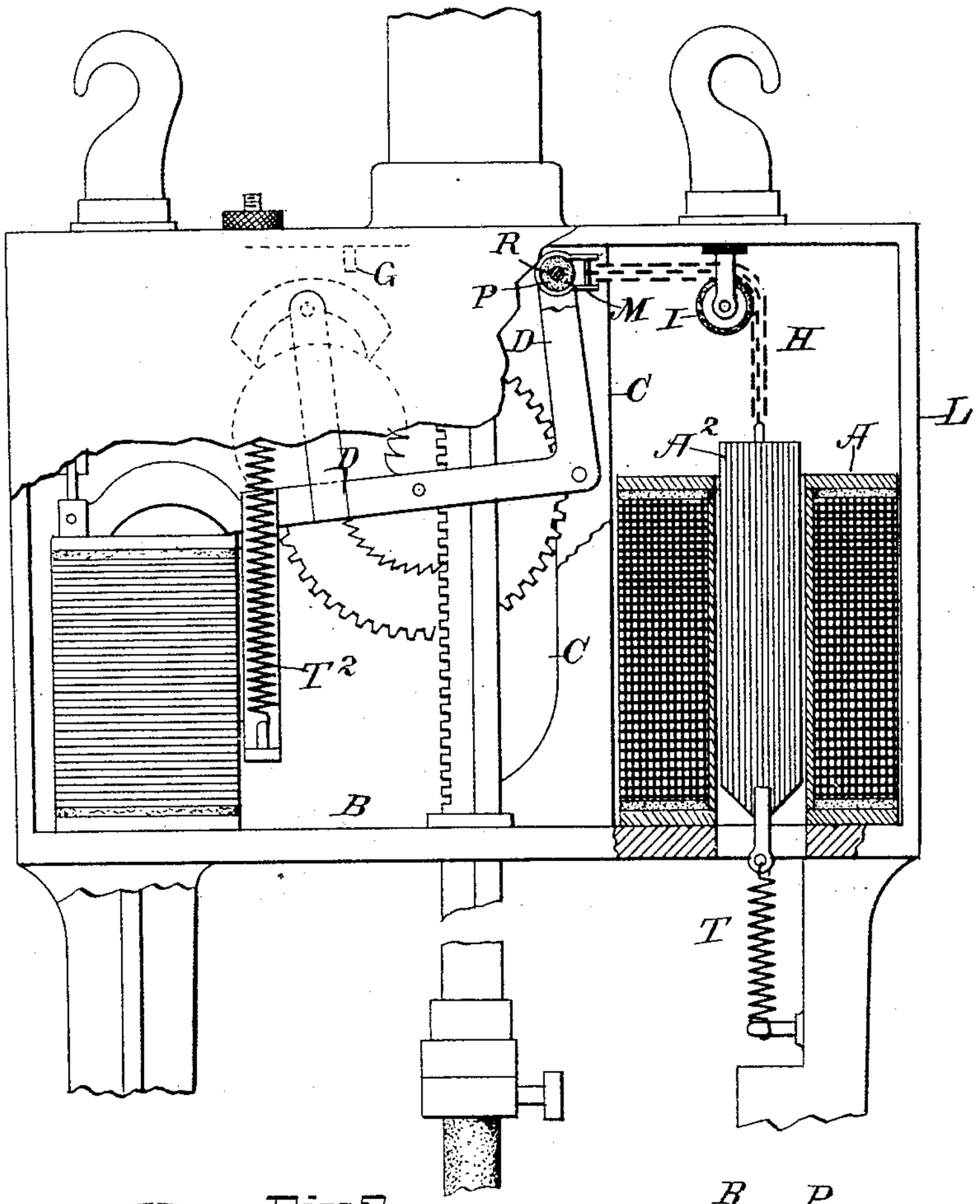


Fig. 3.

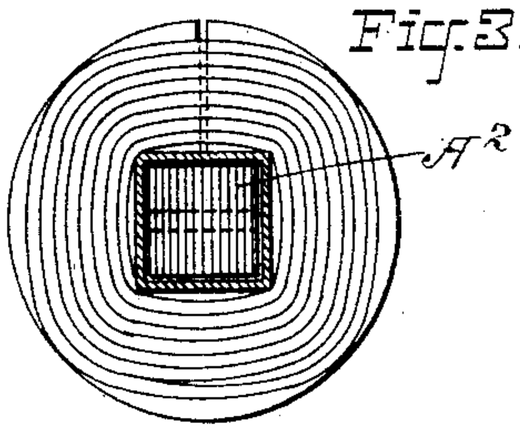
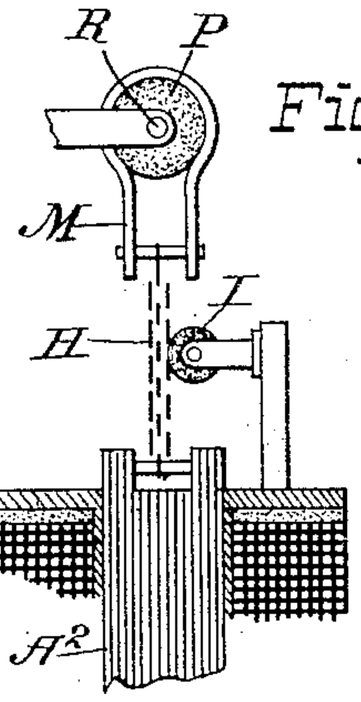


Fig. 2.



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ALTERNATING-CURRENT ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 473,536, dated April 26, 1892.

Application filed March 28, 1891. Serial No. 386,821. (No model.)

To all whom it may concern:

Be it known that I, BARTON B. WARD, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Alternating-Current Arc Lamp, of which the following is a specification.

My invention relates to details of construction of electric-arc lamps, and is designed to adapt arc lamps to use on alternating-current circuits. In the ordinary constructions of lamp a difficulty is found to exist in that the vibrations of the core or other movable portion of the lamp-magnet, produced by the rapid alternations of the electric current, are communicated to the lever or other support which sustains the upper carbon, and the result is a flickering and unsteadiness of action. It is likewise found that the lamp will not "pick up" properly—that is to say, the arc will not be formed properly when the current is turned on, but that the parts will simply vibrate without causing separation of the carbons. Another difficulty arises from the fact that the vibrations are apt to loosen the parts of the mechanism.

The object of my invention is to avoid these difficulties; to which end my invention consists, first, in the combination, with the carbon-supporting lever, of an actuating-magnet connected with the same through a cord or chain, the links of which have lost motion with respect to one another, so as to constitute a loose or flexible connection, whereby vibrations due to alternating electric currents may be prevented from communicating themselves to the lever and carbon.

My invention consists, further, in the application to the connecting parts between the lamp-magnet core and the supporting-lever for the carbon of what I term a "damper," which bears against the connecting parts or against the core itself laterally, so as not to interfere with the lifting movement of such lever, but yet prevents the free communication of the vibrations from the core to the carbon-supporting lever.

My invention consists, further, in mechanically connecting the core or other movable portion of the lamp-magnet with the carbon-supporting lever through an interposed piece or block of some material—such as soft rubber—through which the vibrations cannot be readily communicated to the lever. The damper may be supported on any fixed portion of the lamp frame or mechanism, as will presently appear.

I have herein described my invention as applied to a lamp in which the carbon-supporting lever also sustains the feed mechanism—that is to say, to a lamp in which the movements of the lever after the formation of the arc are depended upon to effect a release of the carbons. It will, however, be readily understood that my invention is applicable not only to this construction of lamp, but to all constructions wherein the carbon is sustained by a suitable lever or other support, which is acted upon by the lifting or holding magnet, the feed being brought about either by the movements of the lever itself or by any other desired means, as well understood in the art.

In the accompanying drawings, Figure 1 is a side elevation of a lamp embodying my invention, the parts being broken away to better illustrate the construction. Fig. 2 illustrates a modification in the manner of applying the damper. Fig. 3 is a cross-section through the lamp-magnet.

L is the lamp-case; B, the base on which the parts are supported, and C a standard on which the carbon-supporting lever D is pivoted. The lever D is herein shown as carrying a feed-regulating train of wheels having an escapement, the action of which is controlled through the engagement and disengagement of the anchor with a suitable stop, (indicated at G.) These parts being of the usual or any desired construction will not be further referred to.

A indicates the lamp-magnet, which operates upon the lever D to lift the carbon and hold it sustained in arc-forming position. In the present instance I have shown this magnet as provided with the usual movable core; but, as will be well understood by electricians, the movable element of the mechanism might be otherwise formed.

The core (indicated at A^2) is laminated or constructed from a number of thin plates of iron having an interposed non-conducting ma-

terial between them, the whole being bolted or pinned together. As shown in the cross-sectional view, Fig. 3, the core is rectangular in outline, and it works up and down in the center of the spool upon which the wires of the electro-magnet are wound. The body of the spool is also square or rectangular in section, and the core is guided therein. The spool having its heads and body portion of brass or other suitable material is, when it is made of conducting material, cut through from the edge to the center in order to prevent the circulation of induced currents. The loose connection between the lever and the magnet is shown in the present case as consisting of a series of links constituting a chain H, which is attached to the lever at one end and at the other to the upper end of the core A^2. This device of itself tends to avoid the difficulties before mentioned, inasmuch as it allows a free vibratory movement of the core in a longitudinal direction to a certain extent without a necessarily-accompanying movement of the lever D. This link connection also avoids communication to a certain extent of any other vibrations from the core.

To still further shut off the vibrations, I apply a damper, (indicated at I,) which bears laterally against the connection between the core and lever and dampens or deadens the quick vibrations resulting from the alternating currents, yet, nevertheless, permitting a slow and steady movement of the core which is required in order to lift the carbon. This damper is herein shown as a pulley or wheel which is sustained on a hanger or support connected to the rigid lamp-case. This damper might be supported, as shown in the modification, Fig. 2, upon the head of the electro-magnet and laterally against the connection between the core and the lever, as therein illustrated.

As a further precaution against the communication of the quick vibrations from the magnet to the lever, I connect the same with said lever through an interposed piece or block of some material—such as soft rubber—through which the quick vibrations may not be readily communicated. For convenience this block or piece of rubber, mechanically interposed, as described, is applied at the point of connection of the chain with the lever. The attachment may be indefinitely varied. I have, however, shown the last link of the chain as connected to a strap M, which encircles a block or washer P, of soft rubber, through which passes a pin R, secured or fastened to the lever D. Any other material like rubber which will not readily communicate the rapid vibrations might be used for the purpose—as, for instance, leather. It is preferable, also, to face the wheel I with some non-resonant or non-vibratory substance, like rubber, which will not take up readily the quick vibrations of the core.

At T is shown a spring connected with the movable core of the magnet, preferably at its lower end. This spring is independent of the usual assisting-spring, (indicated at T^2.) Its office is to check the vibrations of the core.

It will be obvious that all of the devices described need not be employed; but it is desirable to use them, as they all contribute to eliminating the objectionable vibrations in the carbon and its supporting-lever.

The coils of the electro-magnet are wound around the square hollow body of the spool in the ordinary way. As will be seen, the body of the spool has flat sides or is rectangular in external as well as in its internal dimensions, and the wire being somewhat flexible will come down close to the square sides, and thus be in close proximity to the iron core, so as to give an efficient magnetic action.

I am aware that it has been before proposed to construct an arc lamp for use on a continuous-current circuit with a spring attached to the carbon-supporting lever at one end and sustaining the movable core from its other end; but such spring connection does not form a loose or flexible connection adapted to prevent the communication of vibrations produced by alternating electric currents to the lamp mechanism, as I have demonstrated by actual trial.

I am also aware that it has been before proposed to sustain the core of the lamp-magnet by means of a link hooked at one end to the core and at the other to the lamp-magnet; but this device likewise will not prevent the communication of vibrations from the core to the lever, even if the lamp were used on an alternating-current circuit. I find that in practice it is necessary to use a series of links forming a chain connecting the core and the lamp-lever or to use a similar connection loose or having considerable lost motion to permit a free movement of the core of the magnet both longitudinally and transversely. I therefore do not wish to be understood as claiming the use of the single intermediate link.

What I claim as my invention is—

1. In an alternating-current arc lamp, the combination, with the carbon-supporting lever, of the alternating-current lamp-magnet having its movable core or equivalent moving portion connected with said supporting-lever by a loose connection, and a damper of the vibrations applied between the core and the lever, as and for the purpose described.

2. In an alternating-current arc lamp, the combination, substantially as described, with the carbon-supporting lever, of a lamp-magnet having a laminated core connected with the lever through a connection made up of a number of links, whereby the rapid mechanical vibrations of the core produced by the alternating currents may be cut off from the carbon.

3. In an alternating-current arc lamp, the combination, substantially as described, of a carbon-supporting lever, a connecting cord or chain connecting the same with the actuating-magnet of the lamp, and a wheel on which the

chain bears, said wheel being faced with rubber or similar material, as described.

4. In an alternating-current arc lamp, the combination, substantially as described, of a carbon-supporting lever, a lamp-magnet having a movable laminated iron core, a connecting-chain, and a damper with which said chain makes contact, as and for the purpose described.

5. In an alternating-current arc lamp, the combination, with a carbon-supporting lever and the actuating-magnet, of a damper applied between the movable portion of the lamp-magnet and the lamp-lever for cutting off or preventing communication of the rapid vibrations due to the alternating currents, as and for the purpose described.

6. In an alternating-current arc lamp, the combination, with the carbon-supporting lever, of an actuating-magnet having mechanical connection therewith through an interposed piece or block of a material such as soft rubber.

7. In an alternating-current arc lamp, the combination, substantially as described, of a carbon-supporting lever, an electro-magnet having a laminated iron core, and a block of rubber P, interposed between the lever and the connections from the core, as and for the purpose described.

8. In an alternating-current arc lamp, the combination, with the carbon-supporting lever, of an actuating-magnet connected with the same through a cord or chain, the links of which have lost motion with respect to one another, whereby the vibrations due to alternating electric currents may be cut off from said lever.

9. The combination, in an alternating-current arc lamp, of a carbon-supporting lever, a lamp-magnet loosely connected therewith for the purpose of actuating the same, and a spring applied to the movable core or other movable portion of said magnet and acting upon the same in a direction to oppose the retractor which operates against the magnetic influence.

Signed at New York, in the county of New York and State of New York, this 22d day of March, A. D. 1891.

BARTON B. WARD.

Witnesses:
WM. H. CAPEL,
HUGO KOELKER.