(No Model.)

S. E. NUTTING.

ARC LAMP.

No. 440,604. Patented Nov. 11, 1890.

Fig. 1.

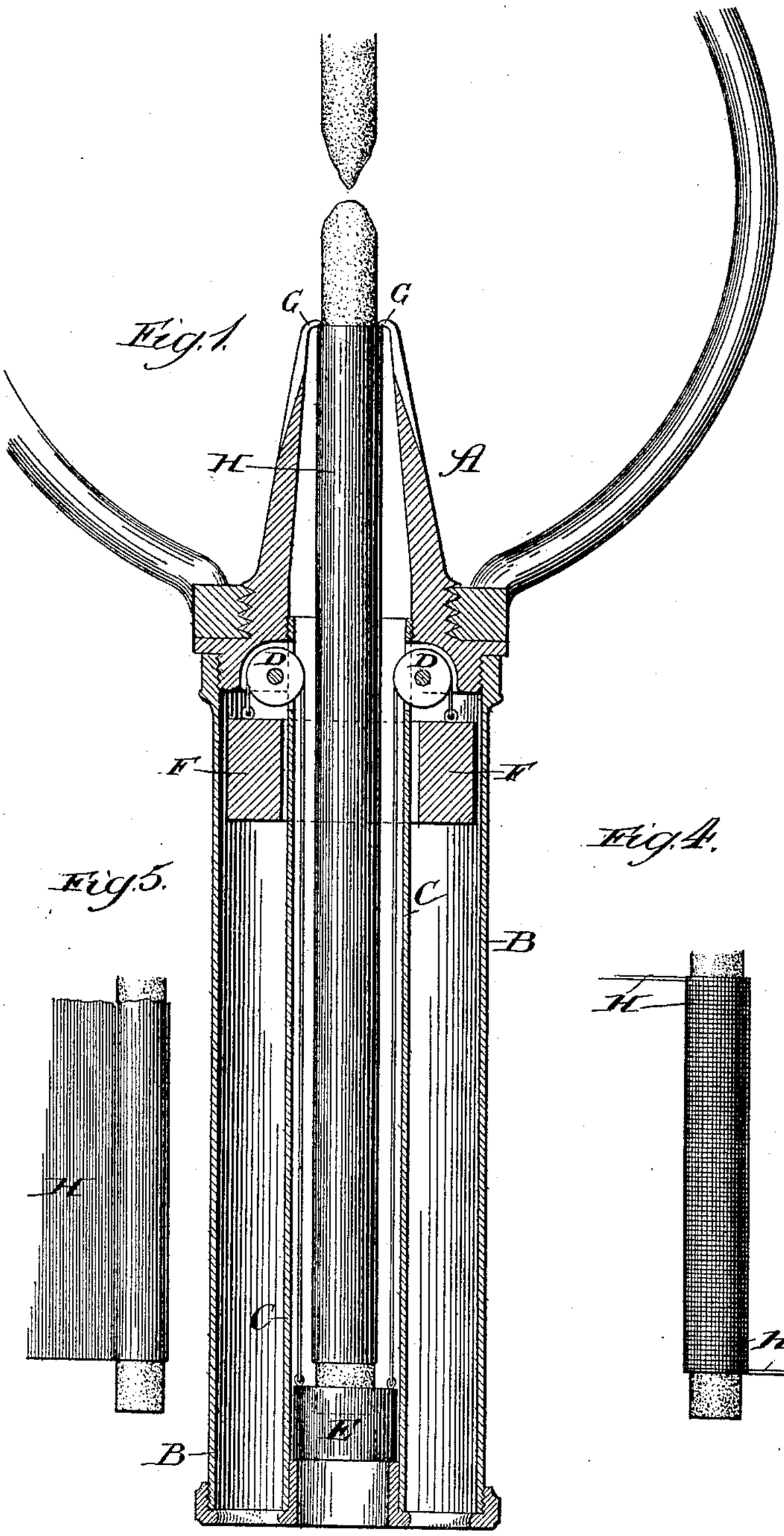


Fig. 2.

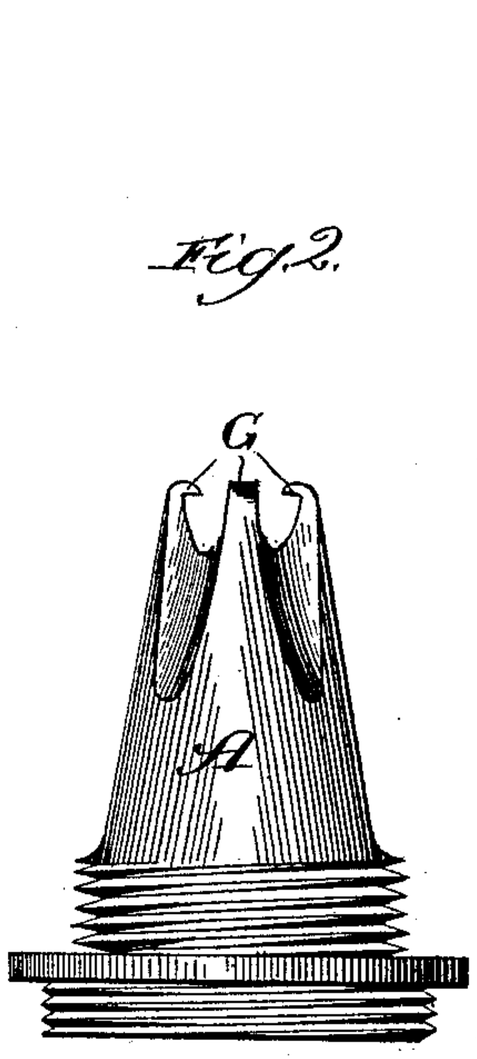
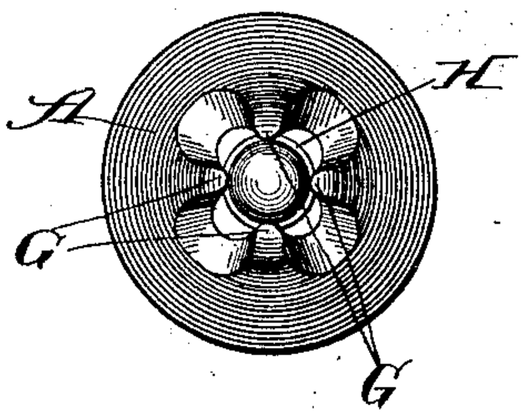


Fig. 3.

Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

SAMUEL E. NUTTING, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE NUTTING ELECTRIC MANUFACTURING COMPANY, OF SAME PLACE.

ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 440,604, dated November 11, 1890.

Application filed March 10, 1890. Serial No. 343,312. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL E. NUTTING, a citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Arc Lights, of which the following is a specification.

The object of my invention, in general terms, is to devise means for advancing the carbons or electrodes of an arc light to keep them in their proper relative positions, so that they will constantly focus at the same point.

In the drawings, Figure 1 is a vertical section taken through the lower portion of an arc lamp; Fig. 2, a side elevation of the carbon-holder; Fig. 3, a plan view of the same; and Figs. 4 and 5, side elevations of the carbon covered or inclosed, as hereinafter described.

In making my improvement in arc lights I arrange a hollow and preferably cone-shaped shell A in the lower portion of the lamp-frame. For convenience I term this shell the "carbon-holder." As shown in the drawings, it is provided with screw-threads and is screwed into the lower portion of the lamp-frame, although it may be attached and secured to the frame in other ways, and, in fact, in any convenient manner. This holder is preferably made of a non-heat and non-current conducting substance and of a refractory and non-fusible material. The higher the refractory quality of the material is the better.

In my application of the invention to use I have usually employed what is generally known as "lava," although any highly-refractory material capable of standing the intense heat of the arc when arranged a short distance therefrom may be used. I preferably arrange the shell B extending below the frame of the lamp and attached to it in any convenient way. As shown in the drawings, this shell is screwed to the lower edge of the carbon-holder, although it may be attached to or sustained by the frame in any desired way. I preferably arrange another shell C within the shell B, so that there is an annular space between the two and open at the bottom, as shown in Fig. 1. This inner shell is shown as screwed to the inner side of the carbon-holder, although it may be secured in place in any convenient manner, or, in fact, entirely dispensed with. Its principal office is to afford a guideway to assist in holding the carbon in its proper vertical position, which could be formed by rods or in other convenient manner.

I arrange pulleys or sheaves D in some convenient place, but preferably immediately under the lower edge of the carbon-holder, as shown in Fig. 1. I also arrange a block or cup E, in which to place the lower end of the carbor, adapted to move up and down in the shell C and be guided in its movement thereby, and run cords from this cup or block up over the pulleys and attach them to the weights F, arranged to move up and down in the annular space between the two shells B and C. As shown in the drawings, these weights are arranged in one annular ring, although they may be made in seperate and distinct pieces, if desired. When the carbon is arranged with its lower end in the cup E and its point in the right position for the arc, the cup will be at its lowest position and the weights at their highest; but as the point of the carbon is consumed by the heat of the arc the weights will gradually move downward and draw the cup with the carbon upward.

Unless there be something employed to retard the upward movement or advance of the carbon it is obvious that the weights would immediately advance it against the upper carbon and constantly hold it in that position. To provide against this and to retard the upward movement of the carbon to just that degree of advance necessary to constantly keep its point in the right position to focus the light at the same place, some means must be employed that will permit an advance in porportion to the constant cousumption of the carbon or electrode at its point. I secure this proper degree of advance and retardation by providing the holder with inwardly-projecting points or fingers G, directed toward each other, but with sufficient space between to nicely and easily permit the carbon to move upward through the opening. To enable these fingers or points to hold the carbon against the upward tendency caused by the pressure of the weights, I wrap or incase the

carbon in a covering H, which is not quite extended up to the point of the carbon. This covering or wrapping need be of only sufficient thickness to enable the points of the holder to impinge against it at its upper edge and to prevent the carbon from moving upward so long as the covering remains intact and undisturbed. The covering or wrapping, however, is made of such material or in such a way as to be burned, changed, disintegrated, or destroyed by the heat of the arc at a lower temperature than that necessary to consume the carbon. This covering or wrapping may be made of thread, paper, cloth, carbon-dust less compacted than the carbon itself, or any other material, no matter what, which will burn, crumble, break, or disintegrate under the heat of the carbon with the same degree of slowness or rapidity that the carbon itself is consumed. As the upper edge of the wrapping or covering is always the same distance below the point of the carbon, it must be capable of crumbling or being destroyed at a lower temperature than that which consumes the point of the carbon, and its distance from the point of the carbon should be so proportioned as to enable it to be consumed or destroyed with the same degree of rapidity as the point of the carbon is consumed. The different materials therefore which may be used for a wrapping or covering should be placed closer to or farther from the point of the carbon as they may be of greater or less refractory nature. For instance, material that is easily destroyed should be farther from the point, while material that is more difficult to be changed by the heat of the arc should be closer to the point. A little experiment with different materials will enable a manufacturer to readily determine the proper distance from the point to have the upper edge of the covering or wrapping. As the covering material is subjected to the heat of the arc, it becomes changed, so that it breaks and crumbles away at the points of the holder and enables the pressure of the weights to move the carbon upward. The breaking and crumbling away of the upper edge of the covering is so gradual, however, that the upward movement of the carbon is maintained in a constant or even advance or progress.

To enable the points of the holder to receive sufficient air to keep them from melting or being destroyed, I prefer to cut away spaces between them, as shown in Fig. 2. This enables the air coming in at the bottom of the shell B to pass up through the holder and out at the spaces between the points, thus constantly protecting them in a measure from the intense heat of the arc.

While I have shown and described my improvement in connection with only one of the carbons or electrodes of the light, I wish it to be distinctly understood that I shall apply it to both if I so desire.

What I regard as new, and desire to secure by Letters Patent, is—

1. In an arc lamp, the combination of an electrode, a covering for the same of a material that disintegrates under the heat of the arc at a temperature lower than is necessary to consume the electrode, with its edge next to the arc at a distance therefrom to cause it to be disintegrated with the same degree of rapidity as the electrode is consumed, and a holder bearing against the edge of the covering next to the arc and holding the electrode from advancing until the edge of the covering is changed, consumed, or destroyed, substantially as described.

2. In an arc lamp, the combination of an electrode, a covering for the same of a material that disintegrates under the heat of the arc at a temperature lower than necessary to consume the electrode, with its edge next to the arc at a distance therefrom to cause it to be disintegrated with the same degree of rapidity as the electrode is consumed, and a holder provided with separate inwardly-turned points bearing against the edge of the covering next to the arc and holding the electrode from advancing until the edge of the covering is changed, consumed, or destroyed, substantially as described.

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