(No Model.)

N. M. GARLAND.

ELECTRIC ARC LAMP.

No. 458,386. Patented Aug. 25, 1891.

Fig. 2.

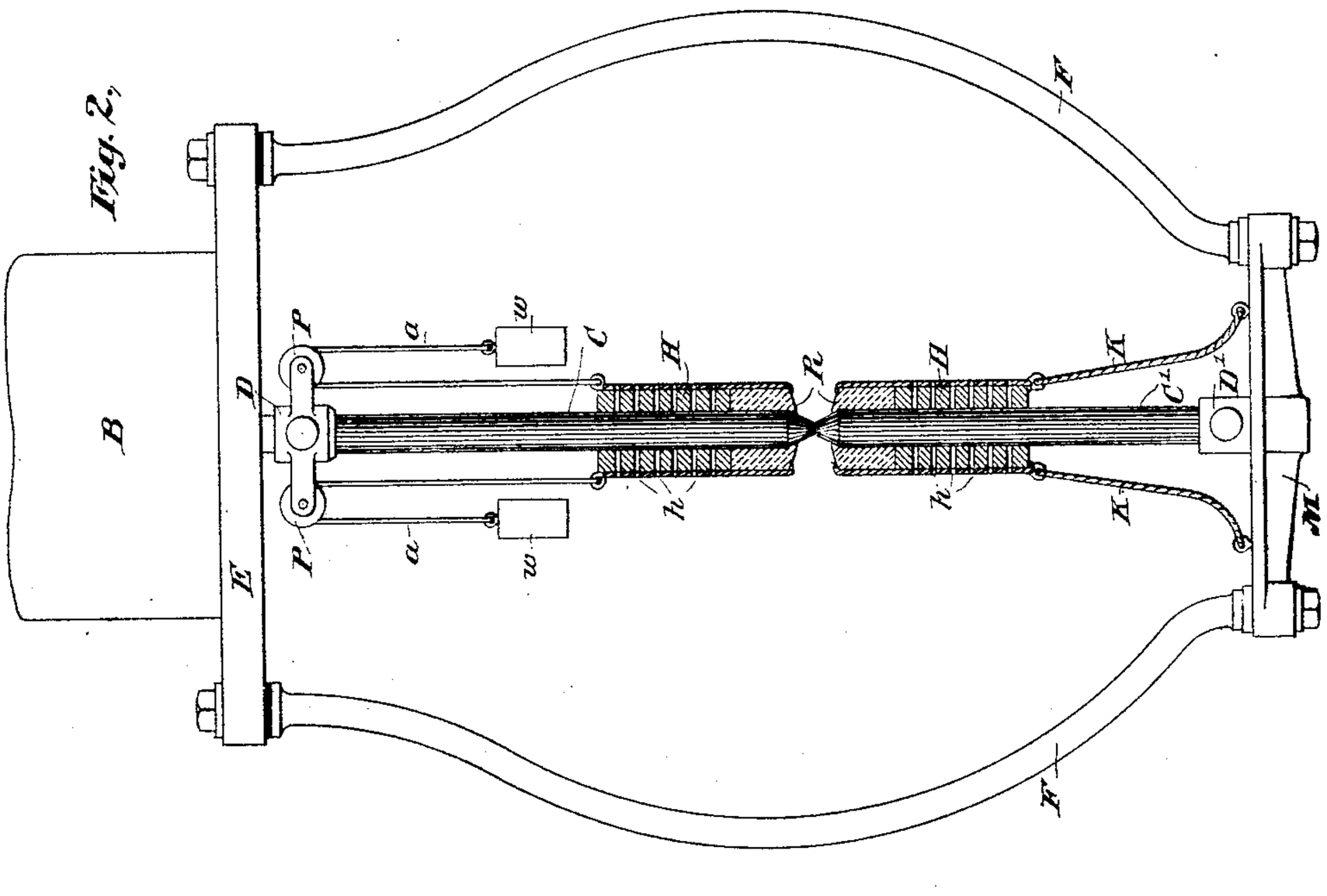
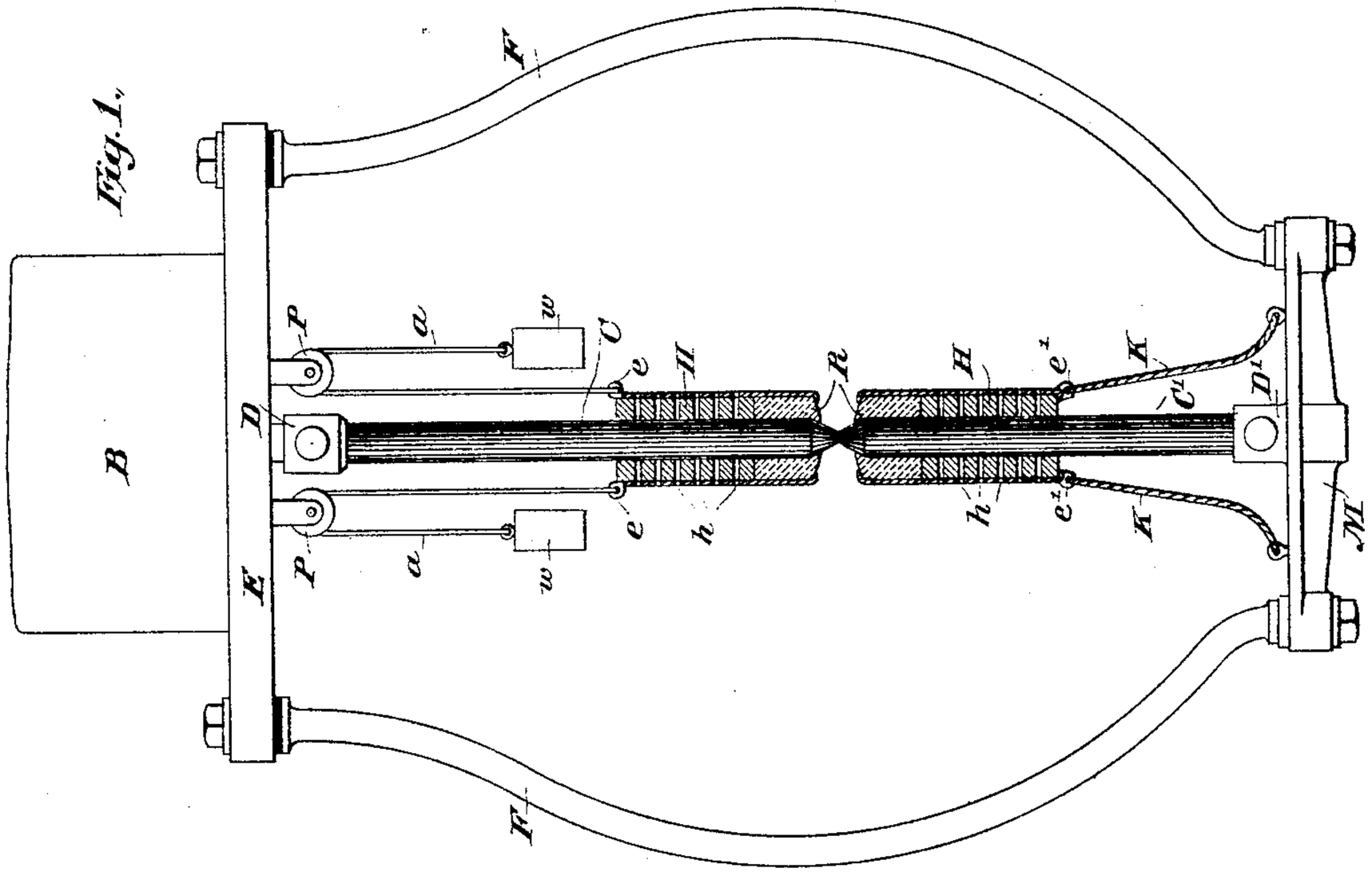


Fig. 1.



Witnesses
Geo. W. Buck.
Edward Thorpe.

Inventor
Nathan M. Garland
By his Attorney
Charles J. Kintner

UNITED STATES PATENT OFFICE.

NATHAN M. GARLAND, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO CLIFT WISE, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 458,386, dated August 25, 1891.

Application filed December 29, 1890. Serial No. 376,156. (No model.)

To all whom it may concern:

Be it known that I, NATHAN M. GARLAND, a citizen of the United States, residing in New York, county of New York, and State of New York, have made a new and useful Improvement in Arc Lights, of which the following is a specification.

My invention is directed particularly to improvements in arc lights of the type in which carbons are fed forward toward each other as the arc elongates through the agency of gravity acting upon the upper carbon, although it is equally applicable to all forms of arc lamps wherein two carbons are made to approach each other as the arc increases in length. It has for its objects, first, the increased length of life of the carbons; second, the prevention of the combustion thereof through the combined effects of atmospheric air and the intense heat produced at the arc; third, the utilization of means which travel with the moving carbons as they are consumed for decreasing the resistance offered to the electrical current as it passes through the lamp; fourth, the diffusion of heat created at the arc, whereby a decrease in the general temperature of the entire lamp and of the space in its immediate vicinity is effected. I accomplish these several objects by the use of the apparatus hereinafter described, but particularly pointed out in the claims which follow this specification.

My invention will be fully understood by referring to the accompanying drawings, in which—

Figure 1 is a side elevational view of an electric-arc lamp of well-known form, showing my improvement attached thereto. Fig. 2 is a similar view of a modified form of my improved apparatus.

Referring to the drawings in detail, M represents the base of the lamp provided with a carbon-holder D′, which supports the lower carbon C′ in vertical alignment with the upper carbon C, suspended from the usual form of carbon-feeding device D, extending through the top of the lamp E into a housing B, which contains any well-known form of feeding and regulating apparatus, the top E and the base M of the lamp being united by the usual side rods F.

It will be understood, of course, that the electrical connections through the feeding apparatus and the carbons are of any well-known construction, and so arranged that the upper carbon C is fed forward as long as the arc continues.

R represents a pair of hoods or caps made of refractory material, such as porcelain or any other non-friable material, having an interior bore of substantially the same diameter as the carbons C and C′, said bore being slightly diminished near the points of the carbons, as shown, so that the conical portion of the lower carbon C′ will have frictional bearing against the inner shoulder thereof, and the same conical portion of the upper carbon will have a like bearing against a similar shoulder of the upper hood or cap. These refractory hoods or caps are each held in place and surrounded by or attached to perforated metallic sleeves H, the interior diameters of which are substantially the same as that of the carbons C and C′, so that they have good electrical contact therewith. The perforations *h h* give increased radiating effect.

The upper sleeve H is provided with a pair of ears *e*, to which are attached conducting cords or chains *a*, passing over pulleys P, secured by standards to the top portion E of the lamp, the free ends of said conducting cords or chains being provided with counterbalances W of sufficient weight to balance the weight of the sleeve H and its hood or cap R, while the lower sleeve H is provided with ears *e′*, which in turn are connected by conducting chains or cords K to the metallic base M of the lamp.

The modified form shown in Fig. 2 is identically the same in construction with the form shown in Fig. 1, except that the pulleys P, which support the counter-balances W and the sleeve H, are all carried by and move with the carbon-holder, this arrangement being especially adapted for gravity-feed lamps, the arrangement being such, as will be readily understood, that the sleeve H, counter-balances, and pulleys will offer no impediment to the forward feed of the carbon and its attached parts, while with the arrangement shown in Fig. 1 slightly-increased power is required

to force the upper carbon forward, and this form may be used in any type of arc lamp in which the upper carbon is fed forward by the combined influence of gravity and a propelling power or by a propelling power alone.

The operation of the apparatus is as follows: The arc having been started in the usual way, the current, which enters the lamp through the upper portion thereof, passes directly through the upper carbon C by the arc and through the lower carbon C′ and out to line. As the arc continues to glow, intense heat, as is well known, is developed at this point, and as a result the entire lamp is often heated to dangerous degrees, to such an extent that where violent drafts of air are admitted the carbons are actually badly damaged by combustion. With my improved apparatus the refractory hoods or caps R absorb the heat, and at the same time prevent any possibility of combustion affecting those portions of the carbon which are shielded by them, while the metallic sleeves H, which surround said hoods or caps, are connected by conducting cords or chains *a* at the top with the metallic portion of the frame and similar cords K to the metallic base of the frame, thereby conducting the heat to the metallic portions of the frame, where it is rapidly radiated or dissipated. By thus decreasing the temperature of the carbons through the agency of the conductors *a* and K, united to metallic surfaces of large radiating capacity, I am enabled to offer decreased resistance to the path of the current—a feature which in itself gives increased efficiency to the lamp and at the same time largely decreases the temperature of the entire lamp and its adjacent area by dissipating heat which would otherwise produce injurious effects.

With the modified form shown in Fig. 2 I am enabled to conduct the current from the carbon-holder D through the metallic cords or chains *a* to a point near the arc, thereby avoiding the necessity of conducting the current through the high-resistance medium of the carbon.

I make no claim herein to the method of increasing the life of an arc-light carbon, consisting in protecting the tip thereof and simultaneously dissipating or conducting away the superfluous heat evolved at or near the arc, as this constitutes the subject-matter of a divisional application filed by me in the United States Patent Office on the 18th day of May 1891, bearing Serial No. 393,226.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. An arc light having its upper carbon provided with a movable protecting cap or hood of refractory material of substantially the same internal diameter as the carbon, but shaped to bear against the coned end thereof and adapted to move in the direction of the support of the carbon as it burns away, substantially as described.

2. An arc light having its upper carbon provided with a movable protecting cap or hood of refractory material, which is held in position against the coned end of the carbon and adapted to move in the direction of the support of the carbon as it burns away, substantially as described.

3. An arc light having its upper carbon provided with a movable protecting cap or hood of refractory material, said cap or hood having a sustaining-bearing against the coned end of the carbon and adapted to move in the direction of the support of the carbon as it burns away, substantially as described.

4. An arc-light carbon provided with a movable protecting cap or hood connected by yielding conductors to the frame of the lamp, substantially as described.

5. An arc-light carbon having a movable protecting cap or hood of refractory material connected to a metallic sleeve which surrounds the carbon and is connected in turn to the frame of the lamp by one or more good conductors of heat, said cap being adapted to move in the direction of the support of the carbon as it burns away, and the heat-conductors being of yielding material, substantially as described.

6. An arc-light carbon having a protecting cap or hood held in place against the shouldered end of the carbon and provided with counter-balances for sustaining its weight, substantially as described.

7. An arc-light carbon provided with a refractory hood or cap attached to a metallic sleeve which in turn is connected by conducting-chains to counter-balances sustained by pulleys, substantially as described.

8. A pair of arc-light carbons provided with a pair of movable protecting caps or hoods, each of said hoods having an internal diameter substantially the same as that of the carbon it surrounds, but slightly contracted at one end, so as to rest normally against the coned end of the carbon, substantially as described.

9. In an arc light, a pair of carbons having a pair of protecting-hoods, one of which is held in position by two or more chains or cords and counter-balances and the other by its own weight, substantially as described.

10. A cap or hood for an arc-light carbon, having a shouldered bearing against the coned end of the carbon, in combination with a retractile device which tends normally to keep the hood in place as the carbon burns away, substantially as described.

11. An arc light having its upper carbon provided with a movable cap or hood which has a shouldered bearing against the coned end thereof, in combination with means for holding said cap or hood always in position.

12. A pair of carbons provided with movable protecting caps or hoods having shouldered bearings against the coned ends of the carbons, in combination with means for forcing said hoods continuously against the ends

of the carbons as they burn away, substantially as described.

13. A carbon for an electric lamp, provided with a movable refractory tip and a conducting-sleeve connected by one or more good yielding conductors with the lower end of the carbon-carrier, substantially as described.

14. In an electric-arc lamp, a cap or hood of refractory material adapted to inclose the tip of the carbon, in combination with a conducting-sleeve connected to the hood and surrounding the carbon, said conducting-sleeve being provided with perforations *h*, substantially as described.

NATHAN M. GARLAND.

Witnesses:

GEO. N. STAYNER, Jr.,

A. V. HINEY.