(No Model.)

W. C. ARMSTRONG.

ELECTRIC ARC LAMP.

No. 564,771. Patented July 28, 1896.

Fig. 1

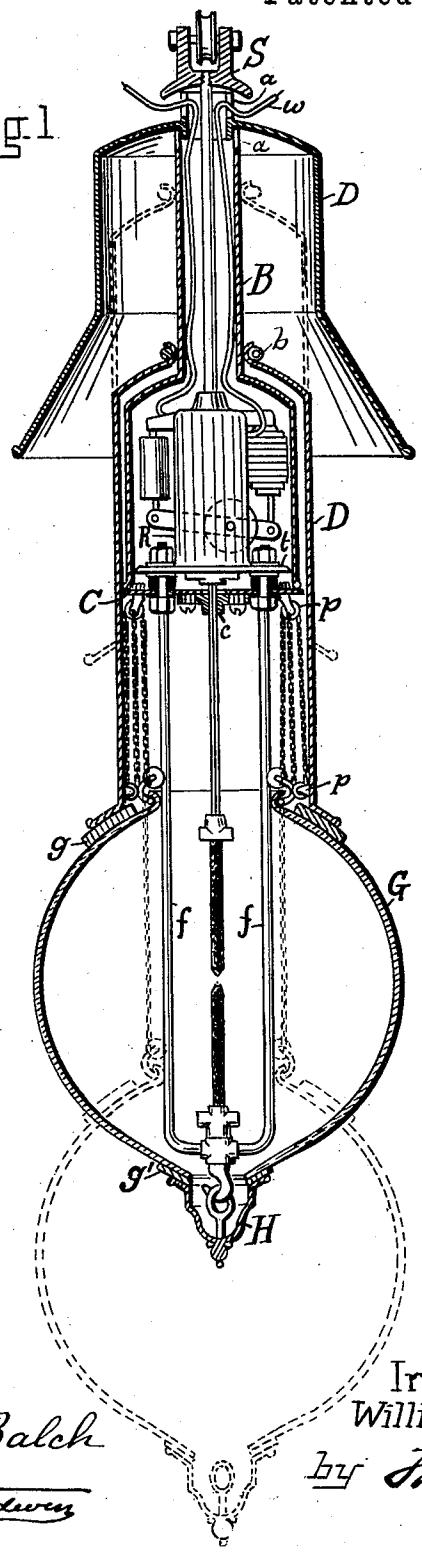


Fig. 2.

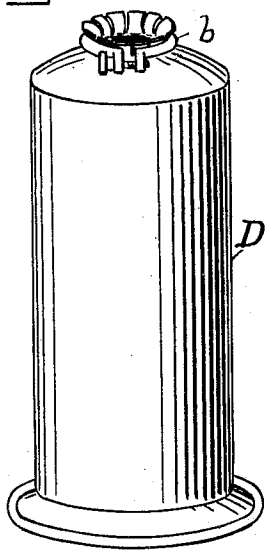


Fig. 3.

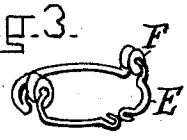
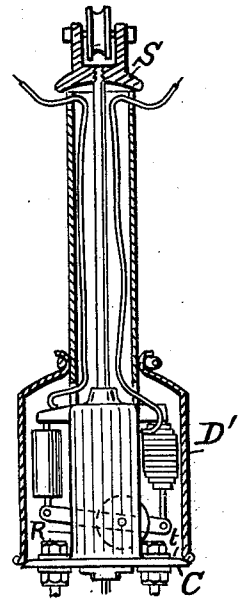


Fig. 4.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM C. ARMSTRONG, OF NEW YORK, N. Y.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 564,771, dated July 28, 1896.

Application filed August 29, 1895. Serial No. 560,905. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. ARMSTRONG, a citizen of the United States of America, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Electric-Lamp Covers and Spark-Arresters, of which the following is a specification.

My invention is applicable to any style of lamp, but is particularly useful with alternating-current lamps, since the noise of these lamps is greater than of direct-current lamps. It is a combined spark-arrester, globe-support, and sliding cover, and is arranged to reduce the renewal of air within the lamp and to muffle the humming of the arc and the rattling of the parts. The construction is such as makes it possible to introduce damping-washers at all contacts where there is likely to be rattling.

The novelty as to the cover consists in a cover which incloses the body of the lamp and is open at its lower end to engage with and seal the upper or larger opening of the globe and is free to slide up and down along the stem above the works, which is usually called the "suspending-tube" or "chimney" of the lamp. The usual cover for the works of the lamp is extended downward below the base-plate of the works. The cover touches this base around its entire circumference. Below this upper base is a second base-plate or lower base, which is attached to the lower frame, which supports the lower carbon. This lower base is large enough to seal and extend slightly beyond the mouth of the inner cover, which it supports. Sparks or flame are thus prevented from getting within the cover to the works. The two bases are separated by insulating washers and bushing to form an air-space. Fumes getting inside the lower cover are dissipated in this air-space and do not reach the works.

The novelty in the globe-support consists in providing pulley-blocks and chains or equivalent mechanism for connecting the globe and outer cover in such manner that when the globe is pulled down the outer cover is pulled up. It also consists in a novel spring-clamp and guide for positioning the globe with respect to the lower frame.

In the accompanying sheet of drawings, which form a part of this specification, Figure 1 is an elevation of an electric-arc lamp with the covers and globe shown in section in full lines in the positions in which they should be when the lamp is burning and in dotted lines in the positions occupied with the lamp open to give access to the carbons. Fig. 2 shows the sliding cover. Fig. 3 is a perspective view of the spring-clamp, which is the upper globe-holder and guide. Fig. 4 is an elevation of the upper part of a lamp with a modified form of cover, which is shown in section.

Referring now to Fig. 1, there is shown therein a lamp which may be of any desired construction. An inner cover or tube B, formed in one piece, incloses the works R and suspending-tube or chimney of the lamp. The tube part incloses the chimney, which in turn incloses the feed rod or rack of the upper carbon. Upon this tube the outer cover D is mounted, so that it can slide up and down along the tube, and hence along the chimney without touching the wires. This cover fits about the tube with a collar-band provided with a screw-clamp, (herein called the "clamping-collar" *b*.) The tube is notched, as shown at *a*, so that the wires can be led out from the lamp. The upper base fits closely within the lower end of this inner cover. An asbestos washer is applied between the inner cover and the lower base C. There is an air-space of about a quarter of an inch between these bases. On the bottom of each base is a guide *c* for the upper carbon-rod. The bolt-holes of the lower guide are larger than the diameter of the bolts, to allow for adjustment to secure alinement of the two guides.

The outer cover extends down around the inner cover and the upper end of the lower frame and is flared at its mouth where the face of the mouth rests upon the globe G, so as to encircle the large opening. This opening is large enough to admit of the lower frame *f f* projecting through it into the interior of the frame. The edge of the opening is flanged over to form a neck. A washer *g*, which is held between the cover and the globe, fits around this neck, and around it there is also hooked a bent wire E, which lies under the neck upon the outside of the globe at all points

except two diametrically opposite points where the wire is bent upward and inward to form springy inward projections upon which guide-rollers F are mounted. This device, which is illustrated in Fig. 3, I call a "spring-clamp." These guide-rollers are porcelain or rubber or other insulating material. This spring-clamp forms the upper globe-holder and guide and is sufficiently springy to dampen any vibrations and allow for expansion of the globe. It centers the globe around the lower frame while in the position of Fig. 1 and while being pushed up or pulled down. The insulating-rollers cut off outside metallic connections with the lower frame.

On the bottom of the lower base and on each side thereof is mounted a pulley-block *p*. At the lower edge of and inside the cover on each side is mounted another chain. Each pulley-block is attached at one end to the upper globe-holder and guide and thence carried over one of the pulley-wheels attached to the lower base, and thence around one of the pulley-wheels attached to the cover and thence up and attached at its other end to a becket on the pulley-block attached to the lower base. The cover is thus connected with the globe and frame of the lamp by chains and pulleys. When the globe is pulled down, it draws up the cover and the two take the position shown in Fig. 2. When the globe is pushed up to the position shown in Fig. 1, the cover D slides down by its own weight and closes the upper opening of the globe, thus sealing the lower frame of the lamp in the inclosed space formed by the globe and cover.

At the lower end of the lower frame is attached a lower globe-holding cap H, which is provided with an eye projecting upward within it. This eye is passed up through the small opening of the globe and engages with a hook *h* on the bottom of the lower frame and supports the globe. Between the globe-holding cap and the globe and encircling neck there shown, I may insert a washer *g'* similar to the one that lies between the outer cover and the globe except as to size. These washers are both preferably made of wool felting which is treated with a non-flammable substance. They may, however, be of cork, rubber, asbestos, or other suitable non-vibrating material which is non-flammable or rendered so.

When the globe is set in place and the globe-holding cap is hooked to the lower frame the outer cover is pressed down firmly upon the washer around the large opening and is clamped. The construction makes it possible to fit the cover to different sizes of globes. The outer cover, the globe, and globe-holding cap are all clamped together and lateral movement of the globe is prevented by the spring-clamp, which forms the upper globe-holder. As this spring-clamp bears against the lower frame the parts are securely held. All joints between the outer cover, globe-holding cap, globe, and frame, and between the inner cover and lower base are sealed with non-vibrating cushions. Thus the ringing or other noises caused by vibrations at metallic contacts is cut off.

The entire works of the lamp are surrounded by air-spaces between the inner and outer covers and between the upper and lower bases. The entire lower frame is inclosed, partly by the outer cover, partly by the globe, and partly by the lower globe-holding cap. There is little opportunity for air to get in and out of the chamber occupied by the carbons. This increases the life of the carbons by diminishing the supply of oxygen. The conditions are also favorable to quietness in the lamp, because the noise can only be transmitted through the globe or through the walls of the outer cover or globe-holding cap, which are separated from the globe by collars, which dampen their vibration and the vibration of the globe.

Over the lamp, between the chimney and the hanger-nut S of the lamp, I attach a bell-shaped storm-cover A, opening downward and extending downward about to the line of the top of the feeding devices of the lamp. This storm-cover has a sleeve which is fitted into the top of the tube, which extends up from the inner cover and is held in place by the hanger-nut S, which is screwed down tightly upon it. This sleeve is notched at *a*, so that the wires can be led out from the lamp, as shown; but if desired the wires may instead be led through the notches in the top of the tube extending up from the inner cover. In this case they will come out under the storm-cover. The cast-iron hanger-nut may rest upon a rubber or asbestos washer and be provided with a roller of rubber instead of porcelain, and the lamp may be suspended by an asbestos rope. The humming is thus diminished.

Fig. 4 is added merely to show that the cover D need not seal the upper opening of the globe, but may merely cover the works of the lamp, as shown in this figure, the mouth of the cover resting upon the base on which the works are set. The cover of Fig. 4 is shaped like that shown in Fig. 2, except as to length, and is fitted with a clamping-collar around the chimney of the lamp, so that it can slide up and down along it, as described. This Fig. 4 is taken from my other application for an improvement in electric-lamp covers and spark-arresters, filed of even date herewith.

The lower part of the lamp is not shown in Fig. 4, as it has no bearing on the invention herein claimed.

Having now completely described my invention, without limiting myself to the precise details shown, what I claim, and desire to secure by Letters Patent of the United States, is—

1. An electric-arc lamp, the works of which are provided with an outer and an inner cover and a chimney of reduced diameter, the outer

cover being fitted to slide up and down along the chimney of the lamp and to inclose the inner cover when the lamp is sealed, substantially as described.

2. An electric-arc lamp the works of which are provided with an outer and an inner cover, the inner cover being sealed with an upper and lower base, and the outer cover being fitted to slide up and down along the chimney of the lamp, substantially as described.

3. An electric-arc lamp provided with works, a chimney of reduced diameter located above the works, a cover to inclose the works, fitted to slide up and down along the chimney, substantially as described.

4. An electric-arc lamp provided with works, a chimney of reduced diameter located above the works, a globe, a cover fitted to slide up and down along the chimney and to fit upon the globe around the upper opening thereof, substantially as described.

5. In an electric-arc lamp, the combination of the works a chimney of reduced diameter located above the works, a globe a cover which seals the upper opening of the globe and is free to slide up and down the chimney of the lamp, and a lower globe-holding cap to seal the lower opening of the globe substantially as described.

6. In an electric-arc lamp, the combination of the works, a chimney of reduced diameter located above the works, a globe, a cover which seals the upper opening of the globe, a lower globe-holding cap to seal the lower opening of the globe, and a clamping-collar on the cover, which surrounds the chimney, whereby the parts can be clamped together, substantially as described.

7. An electric-arc lamp provided with a globe, and a sliding cover connected to the globe by chains and pulleys, whereby the cover is pulled up as the globe is pulled down, substantially as described.

8. An electric-arc lamp provided with a globe, and a cover fitted to slide up and down the chimney and connected to the globe by chains and pulleys, whereby the cover is pulled up as the globe is pulled down, substantially as described.

9. In an electric-arc lamp a globe-holder consisting of a wire collar provided with projections carrying guide-surfaces, to form a spring-clamp and guides, substantially as described.

10. In an electric-arc lamp a globe-holder consisting of a wire collar provided with projections carrying insulating guide-rollers, to form a spring-clamp and guide, substantially as described.

11. In an electric-arc lamp, the combination of a lower frame, a globe covering the lower end thereof, an upper globe-holder consisting of a wire provided with projections carrying guide-surfaces to engage with the lower frame and forming a spring-clamp and guide, substantially as described.

12. In an electric-arc lamp, the combination of a lower frame, a globe covering the lower end thereof, a spring-clamp globe-holder carrying guide-surfaces to engage with the lower frames and covers sealing the openings of the globe, substantially as described.

13. In an electric-arc lamp the combination of the works, a cover inclosing them, and an upper and lower base for sealing the end of the cover, the cover fitting tightly over the upper base and resting upon the lower base, the two bases being separated by an air-space, substantially as described.

Signed by me in New York city this 12th day of August, 1895.

WILLIAM C. ARMSTRONG.

Witnesses:
SAMUEL W. BALCH,
CHARLES KLAUSE.