(No Model.)

N. S. WHITE.

CARBON FOR INCANDESCENT ELECTRIC LIGHTS.

No. 301,192. Patented July 1, 1884.

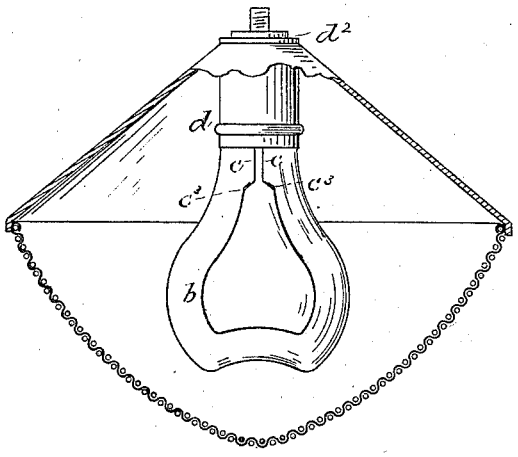

Fig. 1.

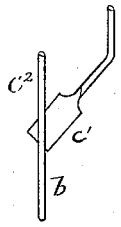

Fig. 2.

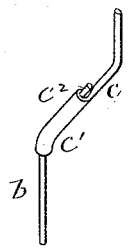

Fig. 3.

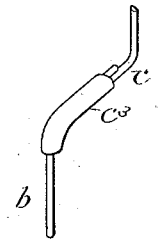

Fig. 4.

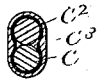

Fig. 5.

WITNESSES

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UNITED STATES PATENT OFFICE

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CARBON FOR INCANDESCENT ELECTRIC LIGHT.

SPECIFICATION forming part of Letters Patent No. 301,192, dated July 1, 1884.

Application filed March 10, 1884. (No model.)

To all whom it may concern:

Be it known that I, NELSON S. WHITE, of Canton, in the county of Norfolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Carbons for Incandescent Electric Lights, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents in elevation an incandescent electric light containing my invention. Figs. 2, 3, 4, and 5 are detail views, hereinafter more especially referred to.

The invention relates to a carbon especially adapted for use in incandescent electric lights, and comprises a carbon filament which supports or carries upon its surface patches or particles of metal or other similar substance, adapted, when heated by the carbon, to diffuse light. I prefer to use a filament of carbon that shall follow very nearly the curve of the globe or bulb thus formed, and be very nearly equidistant from the globe or bulb throughout its length, in order to obtain a better dissemination of the light; and in the drawings *b* represents this carbon filament. I prefer to make it of fiber, and to fill the interstices, and cover or partially cover the surface of the fiber with metal particles, which shall be heated by the carbon, as I find by so doing that I obtain two important results: First, by using a metal which can be heated to a white heat at a low temperature I am enabled by a comparatively slight expenditure of electro-motive force to obtain a very white and intense light, much resembling that of an arc light; and, second, I am enabled to obtain a very brilliant and powerful light.

The first advantage relates to the obtaining of a light by a much weaker current than is now generally employed, thereby enabling me to burn or use more lights with a given strength of electrical current than is now possible; and the second advantage relates especially to the brilliancy of the light, which is very marked, even when a much weaker current is employed. I may use for the purpose silver, brass, iron, zinc, lead, tin, or any other suitable metal or alloy or combination of metals; but I prefer to use the metals which show a white heat at a comparatively low temperature—such, for instance, as silver, tin, zinc, or copper. This metal of course must be disseminated or arranged in or upon the carbon so as not to make a continuous metal connection between the ends of the platinum wire, in order that the carbon may act to cause the necessary resistance to the current to become sufficiently hot to heat the metal particles. I prefer to make the carbon of silk, flax, cotton, or linen fiber or thread; but of course I do not wish to be understood as confining myself thereto.

On some accounts I prefer to use silver as the metal to be united with the fiber; but, as above stated, I do not confine myself thereto. When silver is used, it is treated with an ammoniacal solution formed by dissolving nitrate of silver in water, then precipitating the same with ammonia, and then adding to the precipitate sufficient ammonia to dissolve it. Into this solution the fiber is placed and allowed to soak therein for from two to ten or twelve hours, when it becomes largely covered and saturated with an ammoniacal oxide of silver. The fiber thus treated is stretched and dried, then coated with an adhesive solution, and covered with fine plumbago or gas-house-retort carbon, or a mixture of both, which is well rubbed in thereto, and is held thereon by the adhesive solution. It is then cut into suitable lengths for the carbon filament, and is placed in grooves cut in a carbon plate and covered with a thin layer of plumbago or gas-house-retort carbon, or a mixture of both, and is then carbonized in a muffle. After carbonization the carbon filaments are placed in the silver solution and allowed to remain therein from three to eight hours. This fills the interstices and covers the surface of the carbon with silver, so that it may be said that the carbon is charged on its surface with the silver. Each carbon is then placed in a vacuum and a current of electricity passed through it. It is then taken out and, in some instances, heated again, when it is ready for use. When other metals are used, the carbon and the fiber preferably are metallized by substantially the process herein described—that is, by soaking in the solution of the metal—although I do not confine myself to this method of intimately combining the carbon and the metal.

The carbon thus made may be styled a "metallized" carbon, in that the surface of the carbon is impregnated, and its interstices filled to a greater or less extent with metal. This metallized carbon requires resistance sufficiently high to cause the metal to glow at a white heat.

To connect the carbon with the platinum wire, I prefer to employ a joint, substantially as shown in Figs. 1, 2, 3, 4, and 5—that is, I form upon each end of the platinum wire *c* the tube *c'*. Through these tubes I pass the ends c^2 of the carbon, which are bent on the platinum wire, as represented in Fig. 3. I then connect the wire with the carbon by a cement composed, substantially, of the following elements: plumbago, forty parts; gas-house carbon, thirty-five parts; clay, twenty parts; borax, four parts; sal-ammoniac, one part. The clay and sal-ammoniac are placed in a copper pan and heated to a red heat, fused and pulverized when cold, and are then mixed with the other ingredients and with water. The cement thus prepared is applied with a brush about the joint, (see c^3, Figs. 1 and 4,) and then placed in a gas-jet and heated until red hot, when it is permitted to cool. The cement should entirely cover the joint, and extend well on the platinum wire.

Of course, in the metallized carbon herein described, I do not confine myself to the use of one particular metal, but may use a combination of metals or alloy, if desired. Neither do I confine myself to the use of the cement described, as I find that a very good cement is obtained without the use of the borax and sal-ammoniac.

I do not claim herein the joint, form of the glass globe and of the carbon, and the manner of attaching the reflector and gage to the lamp, as these features are to be included in an application which I am about to make.

I am aware of the Patent No. 259,062, dated June 6, 1882, granted C. J. Van Depoeld, and also Patent No. 194,563, dated August 28, 1877, granted to W. E. Sawyer; but as they do not describe a carbon treated and prepared and having the properties and advantages of the carbon herein described, I consider that they do not embrace the essential features of my invention.

I am also aware that metal filings mixed with carbon adapted for burning in the open air in arc lights have been used; but I consider that they do not contain the essential features of my invention, because I do not consume my metallized carbon, but simply heat the same to a heat in a vacuum to a temperature sufficient to diffuse light.

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

1. A carbon filament for incandescent electric lights, coated with metal particles, substantially as described.

2. In a filament for incandescent lights, a body of carbon carrying upon its surface particles of metal adapted to be heated thereby, substantially as described.

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Witnesses:
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