THE INVENTION OF THE INCANDESCENT ELECTRIC LAMP AWARDED TO EDISON.

In the case of the Edison Electric Light Co. against the United States Lighting Co., which has been pending for about five years, a decision was reached October 4, by the United States Court of Appeals, awarding the incandescent lamp to Edison.

It is unnecessary for us to go into all the details of Edison's case. The main issue is based upon the second claim of Edison's patent, No. 223,898, dated January 27, 1880. According to the interpretation of the court, Edison's second claim is as follows: "The combination of carbon, filamentary or thread-like in size and properly carbonized, used as an illuminant in an incandescent electric lamp, with a receiver made entirely of glass, and conductors passing through the glass, and from which receiver the air is exhausted to such an extent that disintegration of the carbon, due to the air-washing action of surrounding gases, or to any other causes, is so far reduced as to leave the carbon practically stable."

Although the present case does not involve the means or the method of the distribution of the current, the lamp constructed according to this paraphrased claim is the principal factor in a distribution system. Without such a system commercial success could not be attained in incandescent lighting.

Fig. 1 represents Edison's incandescent lamp; and Figs. 2 and 3 are lamps made by defendants, Fig. 2 representing the "M" lamp devised by Maxim, and Fig. 3 the zigzag lamp invented by Weston. To all appearance these lamps are practically like Edison's shown in Fig. 1, except as to the form of the carbon filament. There are, however, differences in construction which a close examination of the lamps themselves will reveal. In defendants' lamps, the carbon filaments are secured to the burners by means of clamps instead of being fastened by means of carbon, and the form of the interior portion of the base of the lamp differs also.

We are indebted to Mr. R. N. Dyer, of counsel for complainant, for very concise information regarding the prior art of incandescent lighting, which we have

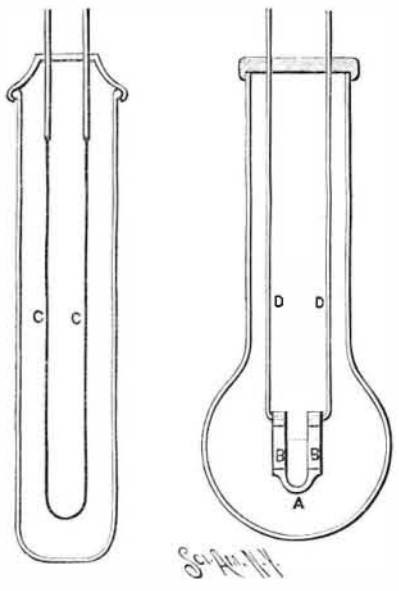


Fig. 7.—LANE-FOX LAMPS.
With globes arranged to be opened when desired.

condensed. According to this statement of the art, King patented in England, in 1845, two forms of incandescent electric lamps (see Fig. 4), one having a burner made from platinum foil placed under a glass cover without excluding the air, the other having a burner composed of a thin plate or pencil of carbon

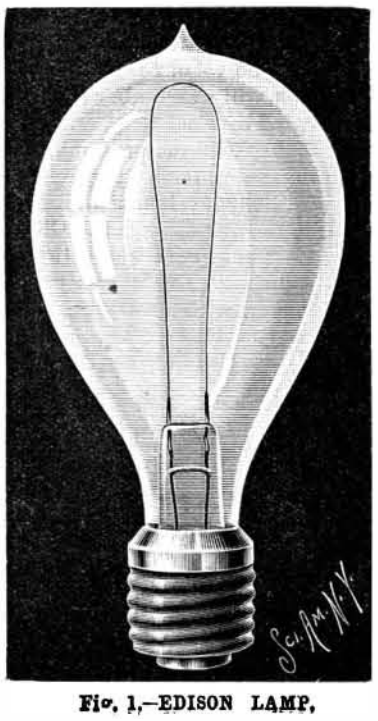


Fig. 1.—EDISON LAMP.

inclosed in a Torricellian vacuum. Roberts in 1852, in an English patent, proposed to cement the neck of a glass globe into a metallic cup and provide it with a tube or stop-cock for exhaust. Lodyguine, Konn, Kosloff and Khotinsky between 1872 and 1877 proposed various ingenious devices for perfecting the joint between the metal and glass, and provided

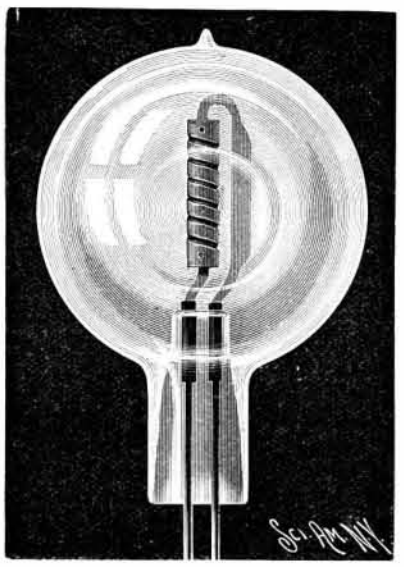


Fig. 8.—ADAM'S LAMP.
Spiral carbon rod inclosed in a globe from which the air has been exhausted.

lamps with several short carbon pencils which were automatically brought into circuit successively as the pencils were consumed (Fig. 5). Bouliguine in 1876 or 1877 proposed the employment of a long carbon pencil, a short section only of which was in the circuit at any one time and formed the burner. Sawyer and Mann proposed in 1878 to make the bottom plate of

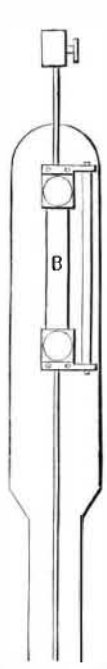


Fig. 4.—KING LAMP.

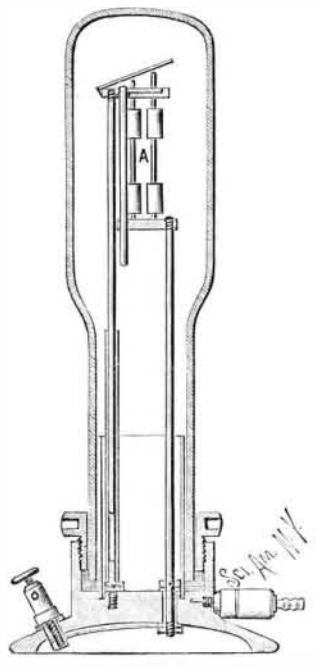


Fig. 5.—KONN'S LAMP.
A, carbon rods to be thrown into the circuit one after the other.

glass instead of metal and charged the lamp with nitrogen.

Mr. Schwendler, a noted English electrical engineer, in the *Telegraphic Journal*, in 1879, makes the following statement: "Unless we shall be fortunate enough to discover a conductor of electricity with a much higher melting point than platinum, and which at the same time does not combine at high temperature with oxygen, we can scarcely expect that the principle of incandescence will be made use of for practical illumination."

This was the condition of the art when Edison took up the subject in 1878. Beginning with platinum, Edison discovered that the melting point of this metal can be raised by subjecting it to the intense heat of the electric current while the inclosing chamber is undergoing the process of exhaustion. He inclosed his platinum burner in a highly exhausted glass chamber, similar to the chambers which had been previously used by Crooke in his radiometer, made of an entire piece of glass, with all joints closed by the fusion of the glass upon itself. He also provided a thermal regulator to prevent the destruction of such a lamp; but with all precaution it proved not to be durable. After other experiments with platinum, Edison substituted for the platinum a short burner of carbon in filamentary or thread-like form. This substitution marked an epoch in the art, and was the step which converted failure into success.

In addition it was found that this construction required no thermal regulator, and could be so cheaply made that the lamp could be thrown away when the burner was finally destroyed.

Aside from producing a durable electric lamp, it was necessary to find out how to subdivide the electric light so as to get small lights for domestic use.

Mr. Edison in this country, and Mr. Lane-Fox in Europe, independently reached and announced the conclusion that the subdivision of the electric light could be accomplished, provided the radiating surface of the burner of the lamp was reduced in extent, and the electrical resistance of the burner increased. The concrete theoretical solution of the problem, as stated by both Edison and Lane-Fox, was a burner having a high resistance and a small radiating surface, or, more accurately stated, a burner having a high ratio of resistance to radiating surface.

Lane-Fox did not produce any practically useful form of incandescent electric lamp embodying this principle, while Edison embodied that principle first in his platinum lamp, and later on in his carbon lamp by the employment in that lamp of a carbon burner having a filamentary or thread-like cross section.

After the production of a durable lamp and the discovery of a correct principle for getting a small light with the same economy as a large light, the great obstacle in the way of a commercial introduction of incandescent lighting was the large size and cost of proper conductors necessary to carry the current to the lamps. The filament of carbon, due to the increased resistance relative to its radiating surface which it afforded, also made a revolutionary advance in the direction of lessening the size and cheapening the cost of such conductors.

We add engravings of the lamps illustrating the prior art.

Decoction of Vaccinium Vitis-idæa in Rheumatism.

In 1887, Dr. Sanine proposed the use of the cowberry plant, *vaccinium vitis-idæa* for rheumatism. Following this, Dr. Herman administered the decoction with good success to three patients, one being an old man who was suffering for three and one half years with muscular articular rheumatism.

Dr. Smirnoff (*Wratch*, through *Bull. de Therapeut.*, 1892, p. 470) used a decoction of the whole plant in the proportion of 30–60 gm. to 500 c. c. water. The decoction is dark in color, not clear, has a bitter taste and neutral reaction. Nine patients were treated; with seven a cure was effected, with two no effect whatever was produced. The treatment lasted from three weeks to three months.—*Am. Jour. Pharm.*

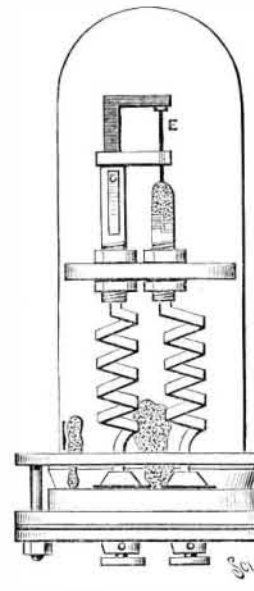
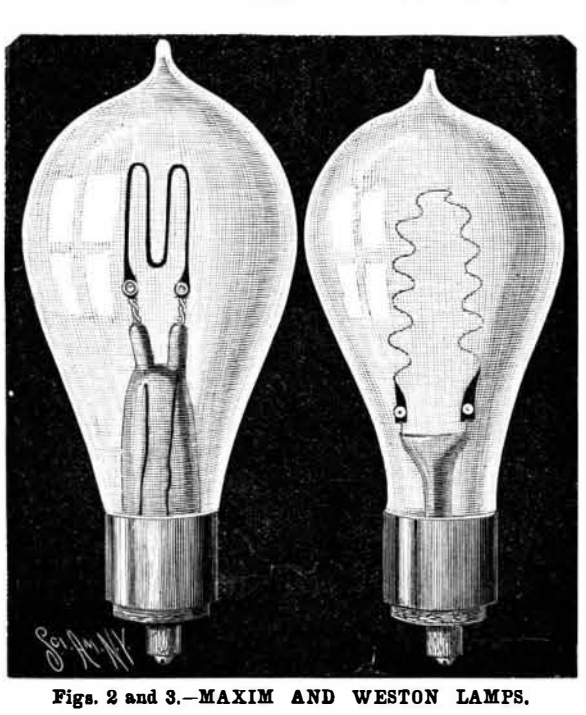


Fig. 6.—SAWYER & MANN LAMP.
E, incandescent rod inclosed in an atmosphere of nitrogen.



Figs. 2 and 3.—MAXIM AND WESTON LAMPS.