Incandescent Electric Lamp Carbon Metal Tungstein Filament Information

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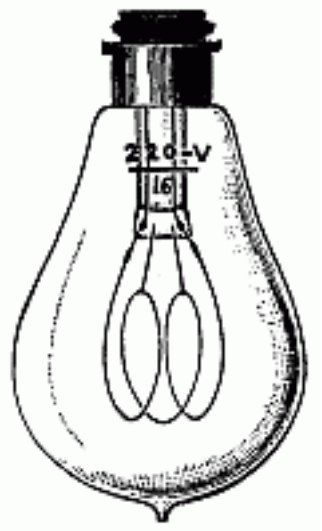

Fig 1. Bamboo filament lamp

Contrary to popular belief, **Göbel** made the first incandescent lamp in 1854. He used bamboo filament - **Fig. 1**. - in an evacuated glass bulb. Because of the electricity production was primitive then and the voltage was anything but steady and well regulated, his bulbs and failed.

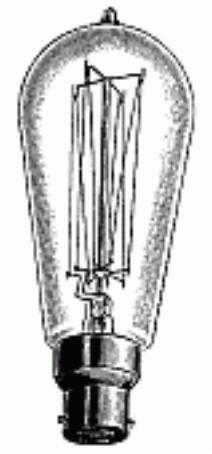

Fig 2. Metal filament lamp

The earliest lamps, introduced by **Edison** in 1878, were made of thin platinum wire; but, as its melting point (1750 °C) is not much above the temperature required as a source of light, the liability to fuse rendered it a commercial failure. Edison rediscovered the carbon filament lamp in 1879, and that was a limited success. It worked, but Edison wanted a longer lamp life. He sent William H. Moore to China and Japan to bring back bamboo samples. Edison and his associated tried over a thousand different bamboo materials when finally he became satisfied.

The major disadvantage of carbon filament lamps that is the carbon begins to volatilize at 1600 °C and filament resistance decreases with temperature. That makes it very sensitive to voltage fluctuation.

Auer Von Welsbach made the first usable electric lamp that used a metal filament in 1897. The metal he used was osmium and his lamps were useable up to 75 Volts. Later, others used tantalum for a filament material. Tantalum was the first drawn metal filament in an electric lamp.

Fig 3. Metal filament lamp

Just, in 1906, used tungsten - **Figure 2**. and **Figure 3**. - first for his lamp but he was unable to make a drawn filament. Tungsten has a very high, 3400 ° C melting temperature, and the hot filament can easily support itself even when it is heated to a white glow. The **General Electric Company** was the first to succeed making drawn tungsten filament lamps. **Langmuir** in 1913 discovered the gas filled electric lamp. The gas filler, prevents the evaporation of the tungsten thereby increased the life of the lamp, but required more electrical power for the same light output.

The efficiency of the lamp is expressed in terms of power consumed per lumen of light obtained. The older light unit was the candlepower. Regretfully the efficiency of the incandescent lamps is very low. Most of the electricity used by a lamp heats up the surrounds and only around five percent of the input power turns into light. Presently the incandescent light is slowly giving way to other types of more

efficient devices. Larger, higher power incandescent lamps have higher efficiencies and smaller ones smaller.

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