

projections. The Gramme construction, because of its many advantages, has been adopted by several designers of dynamos. The Siemens armature, termed the drum armature, is used very largely by dynamo builders, because of the ease with which it can be wound. The Gramme and Siemens type of armature are more largely used than are any other designs.

The Brush armature follows the design of Pacinotti. One fourth of this armature is constantly out of connection and does no work.

Electric Lighting, to-day, is a business of such magnitude, ~~Mr. May~~ *we may* will be astonished at the rapidity of its growth. The principal cause of the sudden growth of a system practically in its infancy in 1878 may be ascribed to two causes: the Paris Exhibition and the Jablochkoff Electric Candle exhibited there. Machines we had, a practical electric lamp we had not. The Jablochkoff candle, so astonishingly simple, seemed destined to fill the vacancy, and caused a great revival of interest in Electric Lighting. The Jablochkoff candle, however, was not to fill the void. It remained for others to devise a lamp more suited for general use than was the Jablochkoff candle. The Jablochkoff candle is suited to the alternating current only, and never came into extended use because of its unsteady light.

On our side of the water new life was given to Electric Lighting by the invention of Brush, of Cleveland. His invention made it possible to sustain many lamps on one wire, a thing electricians said then could not be achieved.

In Arc lamps, before the time of Brush, a rock and pinion with a clockwork movement was the most reliable method in use for maintaining the carbon rods at a given distance from one another. In such a system, it was impossible to keep more than one lamp burning on one circuit from one machine.

Brush devised a very simple method termed a shunt, which forms a part of every lamp, making each lamp independent of each other lamp. Good lamps are now so perfect in action, it is impossible to see the movement of the carbon rods as it occurs.

Following Brush came many inventors, notably Weston, Maxima, Thomson and Houston, with all of whom you are doubtless familiar.

In incandescent lighting experimental attempts date to Page and Star in 1842. Sawyer and Man, in 1878, were undoubtedly the original inventors of the first successful incandescent lamp. The researches of Edison gave great stimulus to that branch of Electric Lighting.

The incandescent lamp is composed of a carbonized filament of Bamboo, chemically treated paper, or other suitable substance induced to the requisite thinness. The filament when ready for use is mounted in a suitable glass globe, in which a vacuum to the one-millionth atmosphere is then produced, and the globe hermetically sealed by a glass blower. The lamp is then mounted as you see them in use.

The incandescent form of lamp has been made of various candle power,