

It was not until twenty years after Farada's discovery the first successful machine was produced, capable of sustaining the electric arc light.

Pacionotti is recorded as the first designer of a continuous current machine. Pacionotti conceived the method of revolving a continuous ring of iron before the poles of a strong magnet. The ring he divided into sections, with projecting teeth and wound on each section a coil of wire. On revolving the ring the polarity of each successive section or portion of the ring is changed, as it passes before the poles of the magnet, and currents are induced in each coil as it comes into the position of greatest magnetism. Instead of the alternating current of the Pixi machine we obtain in the Pacionotti dynamo a continuous current by means of a commutator or ring, divided into as many segments as there are sections in the revolving ring, each segment being connected to the corresponding spool of wire. The current is commuted and carried away by means of strips of copper resting on the commutator.

The action of this machine and of all continuous current dynamos may be likened to the familiar chain pump. The chain pump you will remember is operated by the revolution of an endless chain running over a wheel, and passing through a tube just large enough to admit the disk formed links, placed at intervals in the chain's length.

On revolving the chain, the disk links act as linkets bringing to the top of the tube a given amount of water on each revolution. The energy absorbed is proportional to the speed at which the chain travels and to the amount of water raised. In the Pacionotti dynamo each spool of wire acts as does the disk links on the chain, throwing into the electric circuit a given amount of electricity at every revolution.

The analogy is not quite true, but will serve as an illustration of the primary action occurring in the dynamo. The difference lies in the fact that the potential of the water raised remains constant, but the potential of the electric current produced increases as I have before stated directly as the speed.

In place of the permanent magnet used by Pixi, Pacionotti used the current generated by his machine to charge its own field magnets, the method now universally used in all continuous current machines. Pacionotti was followed soon after by Gramme who reinvented his ring, and by Siemens.

The action of the Gramme ring is in all respects the same as that of the Pacionotti ring. The Gramme ring differs only from the Pacionotti ring in the absence of teeth or projections on its periphery. The winding of the armature is greatly facilitated by the absence of the 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 Pacionotti. One fourth of

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