

Dynamo-Electric Generators

- ◆ Soren Hjorth
- ◆ Siemen's Armature
- ◆ Self-Excited Field
- ◆ Henry Wilde
- ◆ S. A. Varley
- ◆ Wheatstone

Terminology

- ◆ Magneto-Electric
 - ◆ Permanent Magnet Field Systems
- ◆ Dynamic Electricity
 - ◆ Electricity Generated By Rotary Motion
- ◆ Dynamo-Electric (Dynamos)
 - ◆ Electromagnetic Or Wound Field Systems
 - ◆ Mechanical Into Electrical Energy
- ◆ Electro-Dynamic
 - ◆ Electric Motor
- ◆ Alternator
 - ◆ Alternate Current Generator

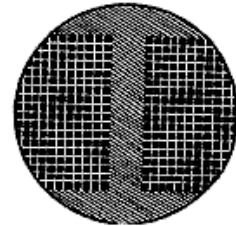
Soren Hjorth

- ◆ British Patent # 806 (1855)
- ◆ "An Improved Magneto-Electric Battery"
 - ◆ Never Built
- ◆ Electric Generator
 - ◆ Main Excitation Derives From Electromagnets
 - ◆ **Permanent Magnets For Initial Excitation**
 - ◆ Previously Permanent Magnets
- ◆ Close To Principle Of Self-Excitation

By the mutual action between the electric magnets and the armature, an exciting force is obtained, which in the result produces electricly greater in quantity and intensity than has hitherto been obtained by any similar means.

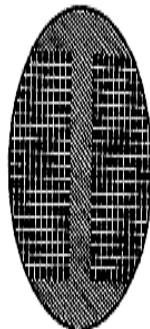
E. W. von Siemens

- ◆ Kept Armature Coils Within Field Of High Intensity
- ◆ "H" Or 2-Polar Shuttle Armature
 - ◆ Patent - 1856
- ◆ Advantages
 - ◆ Higher Working Speeds
 - ◆ Smaller Relative Dimensions



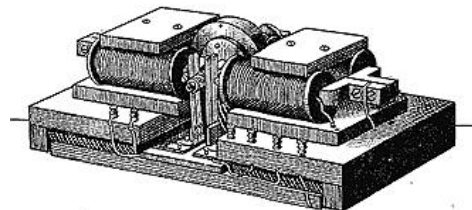
Henry Wilde (1833-1919)

- ◆ Patent # 3006 (1863)
- ◆ Combination Of
 - ◆ Electromagnetic Generator
 - ◆ Magneto-Electric Exciter
- ◆ Self-Excited Field
- ◆ Later Called A Dynamo-Electric Generator
 - ◆ Pulsating DC Current
- ◆ Used In Electroplating Industry



S. A. Varley

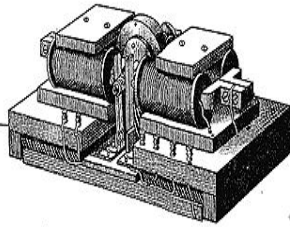
- ◆ 1866
- ◆ Self-Excited Electromagnetic Generator



An electric current, passed through the coils of the electromagnets, secures a small amount of permanent magnetism to their cores.

Charles Wheatstone (1802-1875)

- ◆ Utilized
 - ◆ Siemens Armature
 - ◆ 2-Segment Commutator
- ◆ Produced Pulsating Unidirectional Current

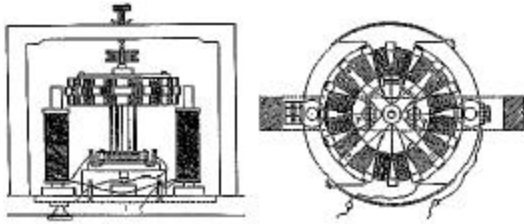


Dynamos

- ◆ Unidirectional Pulsating Current
 - ◆ 2 Segment Commutator
 - ◆ Today, Half-Wave Rectifiers
 - ◆ Produced Eddy Or Circulating Currents In Cores Of Field And Coil
 - ◆ Resulted In Heat Build Up
 - ◆ Water Cooled
- ◆ Led To
 - ◆ Ring Armature
 - ◆ Multi-Segment Commutator

Antonio Pacinotti (1841-1912)

- ◆ 1860
 - ◆ Ring Armature (Multiple Armature Coils)
 - ◆ Multi-Segment Commutator
- ◆ Dynamo Or Electric Motor

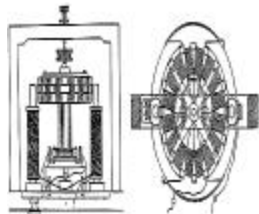


Gramme Armature & Successors

- ◆ Gramme
- ◆ Drum Armature
- ◆ Siemens & Halske
- ◆ Burgin
- ◆ Wenstrom

Zenobe Gramme (1826-1901)

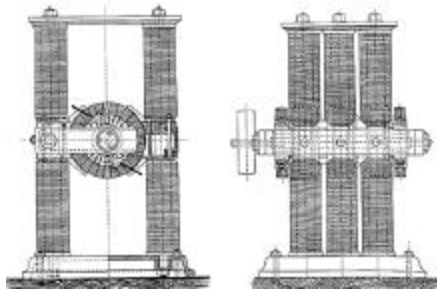
- ◆ Gramme Armature (1870)
 - ◆ Ring Armature
 - ◆ **Parallel**
 - ◆ True Continuous Current
 - ◆ Core - Coil Of Soft-Iron Wire
 - ◆ Series Of Copper Wire Wound Around Core
 - ◆ Adjacent Ends Connected
 - ◆ **Continuous Winding**
 - ◆ Junctions To Commutator
 - ◆ Armature Rotated In 2-Polar Magnet System



Gramme Armature

- ◆ Very Successful
 - ◆ Continuous Current
- ◆ Uses
 - ◆ Lighthouse Illumination
 - ◆ Electroplating
 - ◆ Factory Illumination
- ◆ Driving Force - Steam & Hand
- ◆ Field Systems
 - ◆ Permanent Magnets
 - ◆ Electromagnets

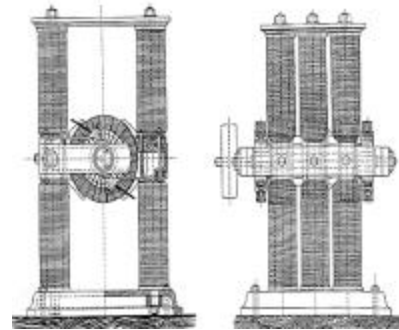
Gramme Company (1873)



Clock-Tower At Westminster
Powered Electric Arc Light

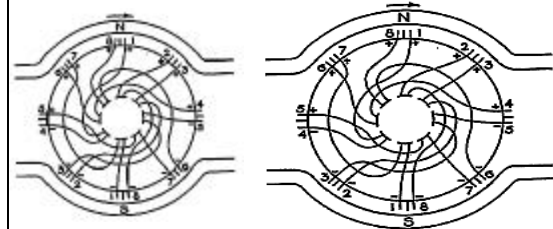
Gramme company (1874)

- ◆ Ships
 - ◆ French (2)
 - ◆ Russian



Drum Armature

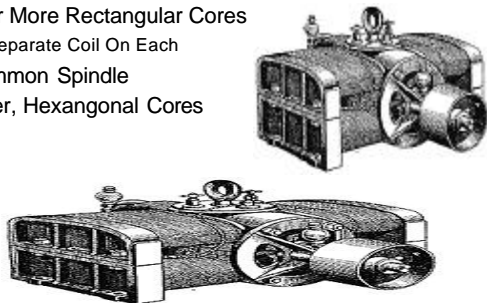
- ◆ Ring Armature
 - ◆ Inefficient - Inner Portion Is Ineffective
- ◆ Siemens & Halske Company
 - ◆ F. von Hefner Alteneck
- ◆ Surface Winding Running Parallel To Drum
 - ◆ Greater Part Of Winding Is Employed



Drum Armature

Emil Burgin (1880s)

- ◆ Multiple Version Of Ring Armature
- ◆ 4 Or More Rectangular Cores
 - ◆ Separate Coil On Each
- ◆ Common Spindle
- ◆ Later, Hexagonal Cores



James Wenstrom

- ◆ Electrical Co. Of Sweden
- ◆ Patent 1882
- ◆ Embed Armature
Conductors In Slots Or
Channels In Armature
Core
- ◆ Still Used Today

