

SEBASTIAN ZIANI de FERRANTI PIONEER OF ELECTRIC POWER

by Brian Roberts, CIBSE Heritage Group



Sebastian Ziani di Ferranti, 1864-1930
(Portrait Institution of Electrical Engineers)

Sebastian Z de Ferranti was an outstanding electrical pioneer. He was first employed as an assistant to the Chief Research Engineer at Siemens Brothers in London, later setting up Ferranti, Thompson & Ince to manufacture alternators under licence from Sir William Thompson. In 1883, he set up S Z de Ferranti Ltd. He developed high voltage alternating current systems, manufacturing equipment and building the first modern power station at Deptford.



Sebastian Ziani, Doge of Venice



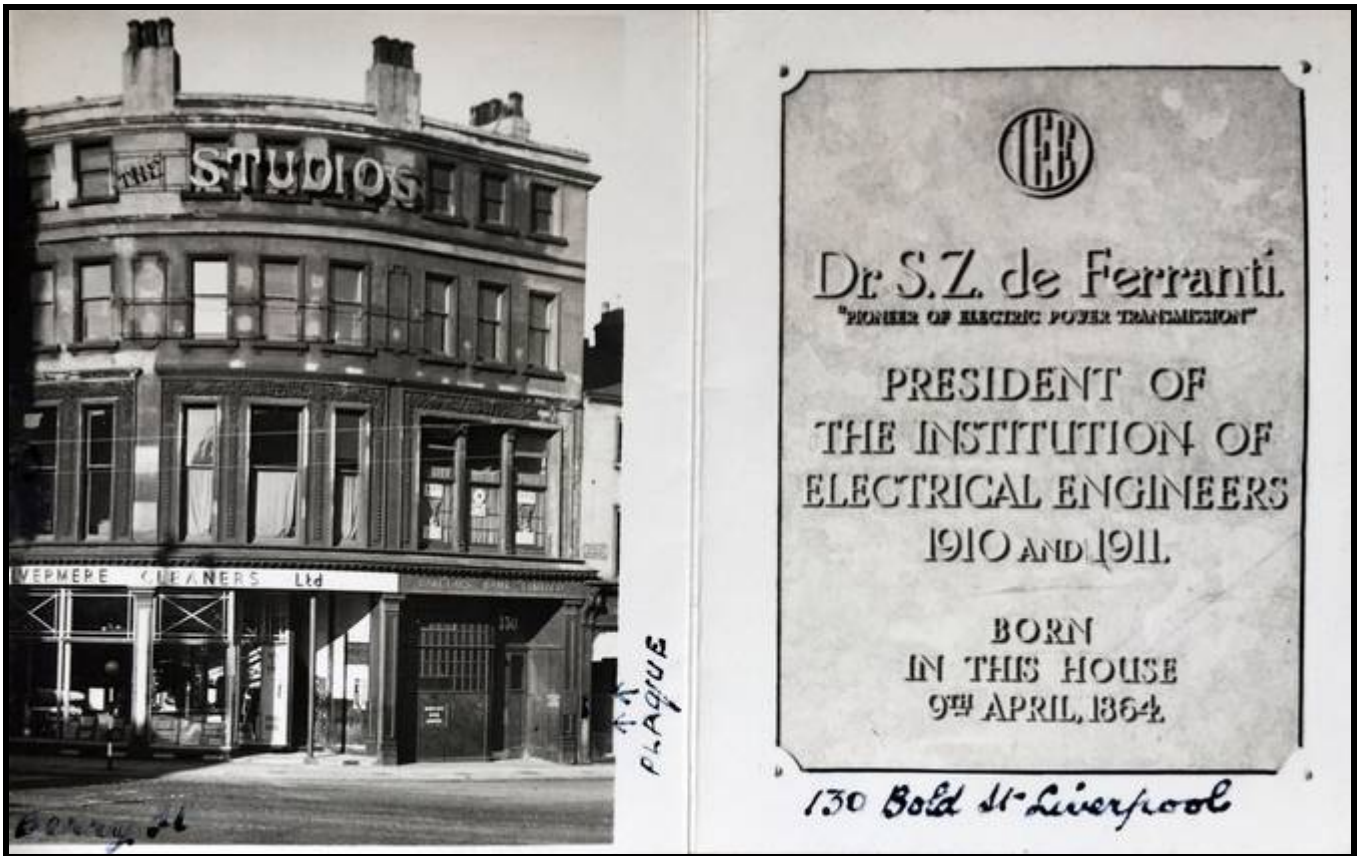
Ferranti's ancestry can be traced back to Sebastian Ziani who was born in 1102 and who, after a distinguished career in the service of the Venetian Republic, was elected Doge in 1173, his family being then the richest and most influential in the State.

Members of the Ziani family continued to hold distinguished positions in the various City States of Italy throughout the Middle Ages. In the early 19th century Marc Aurelio Ziani (who later added "de Ferranti" to his name) resided in Bologna. His later life was passed at the Court of the King of the Belgians, where he was Guitarist to the King coming into contact with famous musicians such as Paganini and Rossini.

Marco's son, Cesar de Ferranti, was educated on the Continent but settled in England in early manhood and established a photographic art studio at Bold Street in Liverpool. There he met the painter William Scott and his daughter Juliana, both leading portrait painters of the time. Juliana's first husband was a Polish musician, Count Szczepanowski and they toured Europe giving concerts in all the capitals, but the Count died leaving Juliana with little money and young children to support. She became a music teacher to the family of Ince-Blundells in Lancashire and it is here that Cesar met and fell in love with her. They married on the 4th November 1860, at St George's Church in Liverpool. Their son, Sebastian Ziani de Ferranti, was born on the 9th April, 1864.



Cesar di Ferranti



The photographic studio at 130 Bold Street in Liverpool with its commemorative plaque



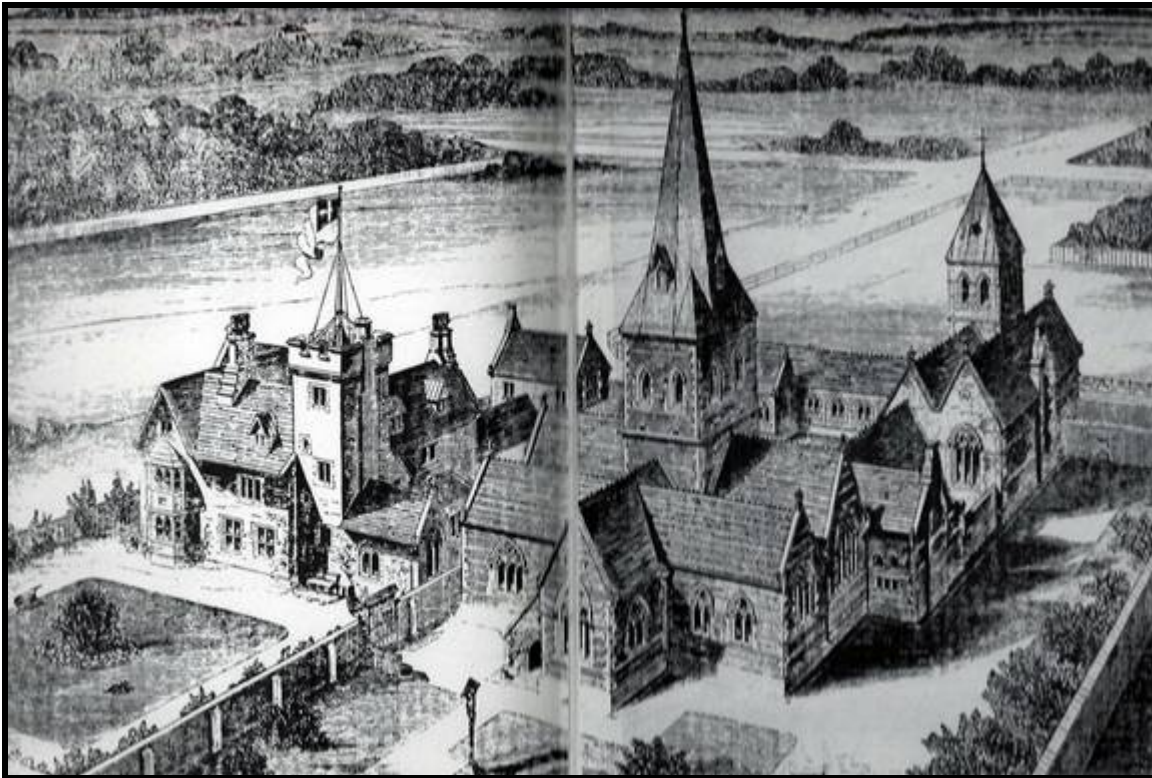
Sebastian's father, Cesar di Ferranti



Sebastian's mother, Juliana



The Ferranti family (left to right): Juliana, Vanda, young Sebastian on Cesar's knee



Sebastian went to the College at St Augustine's, Ramsgate, Kent

FERRANTI AND ALEXANDER SIEMENS

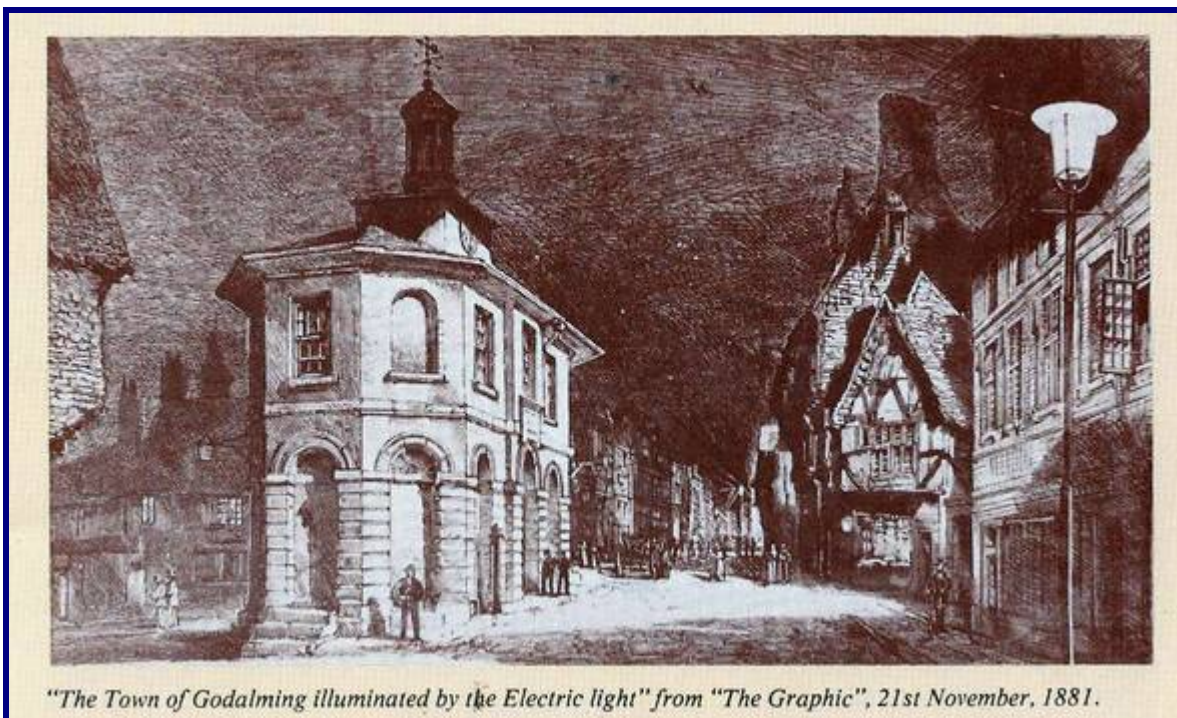
At the age of seventeen Sebastian Ziani de Ferranti was appointed by Alexander Siemens to the Experimental Department of the Siemens Works at Charlton.



Siemens Works in 1863



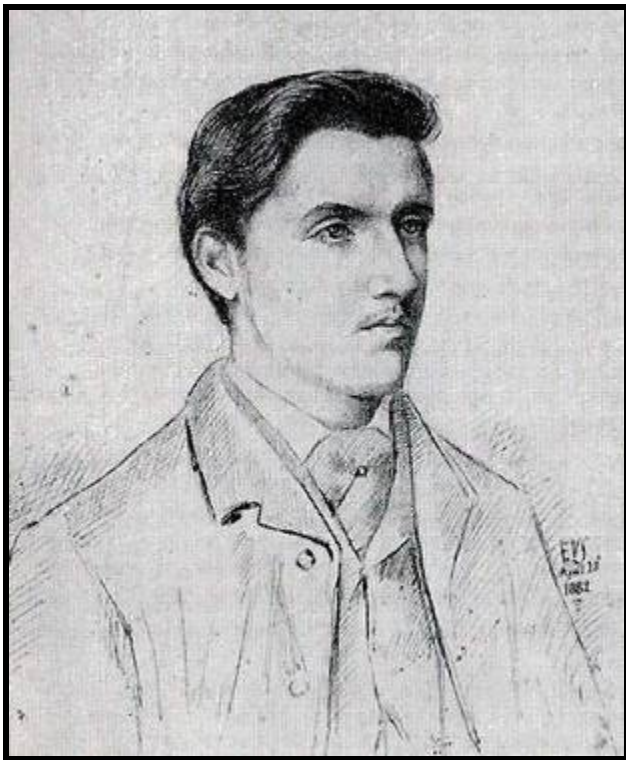
Alexander Siemens (1847-1928) had a distinguished career in the Telegraph and Electrical industries. Born in Hanover in Germany, Siemens was educated at Berlin University, served in the Prussian Army receiving the Iron Cross in the Austro-Prussian War, before heading up the London Company and later becoming a British citizen. He was a founding member of the Society of Telegraph Engineers & Electricians (later the IEE), serving twice as President. In 1910, he served as President of the Institution of Civil Engineers and for 1913-14 he was Secretary of the Royal Society. A lesser known fact is that in 1881 he supervised the installation of the world's first public electricity supply at Godalming in Surrey.



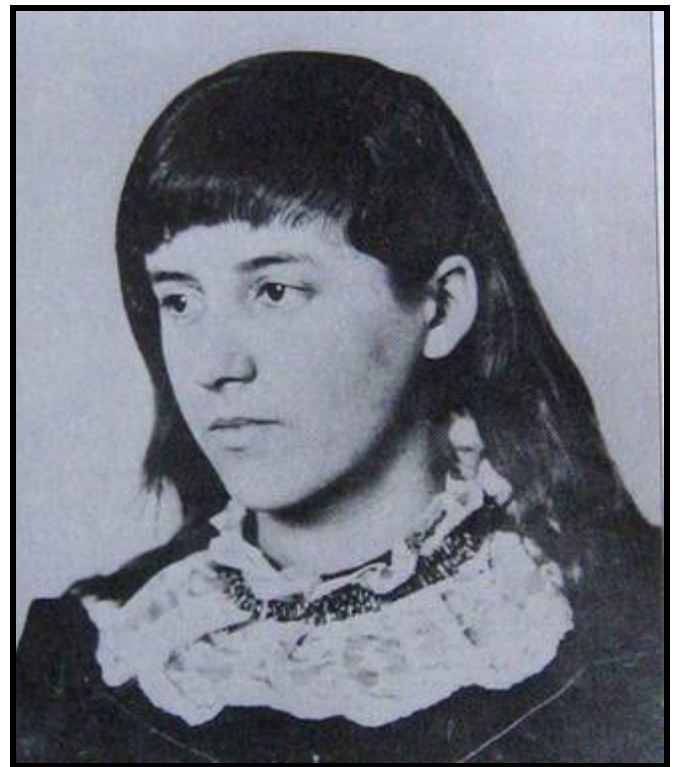
THE CAREER OF FERRANTI

While travelling around the country supervising the installation of electric lighting plants, he became acquainted with the engineer Alfred Thompson. Having completed his inventions of a generator and an arc lamp (which he had started at school), Ferranti entered into partnership with Thompson to take out patents in the Ferranti name, form a company and share the profits. (Since Ferranti was still a minor of eighteen his father was legally required to give consent to this agreement). Patent Nos. 3418 & 3419 covering these inventions were taken out in 1882.

Meanwhile Thompson introduced Ferranti to a wealthy London lawyer, Francis Ince, who had a strong interest in the electrical sciences. Sebastian met the family and the young daughter Gertrude. After a long courtship, Gertrude and Sebastian were married on the 24th April, 1888. She was then nineteen. He was twenty four.



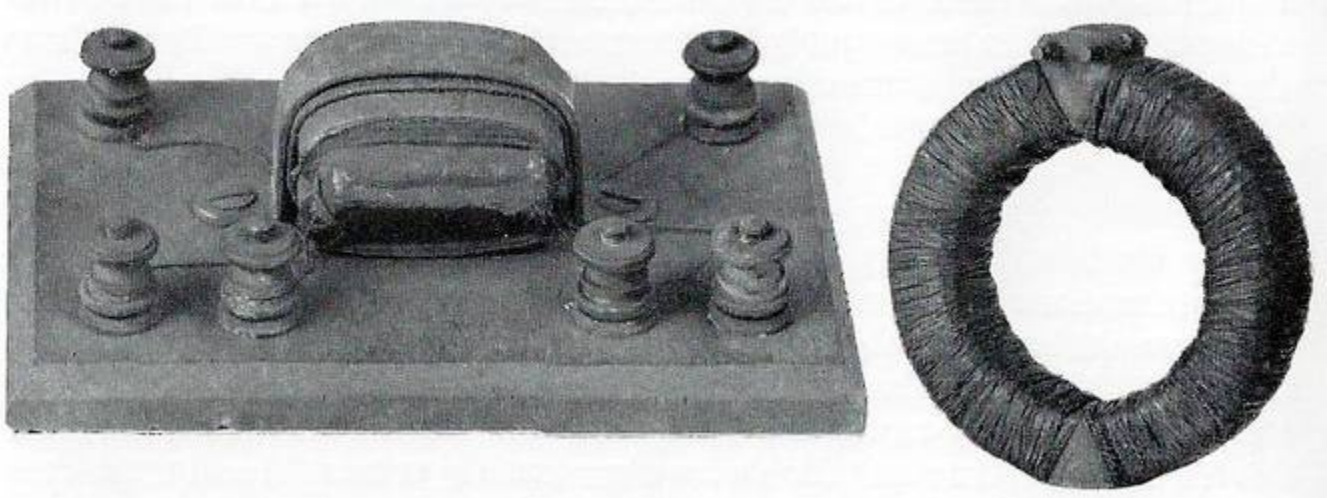
Sebastian Ziani di Ferranti



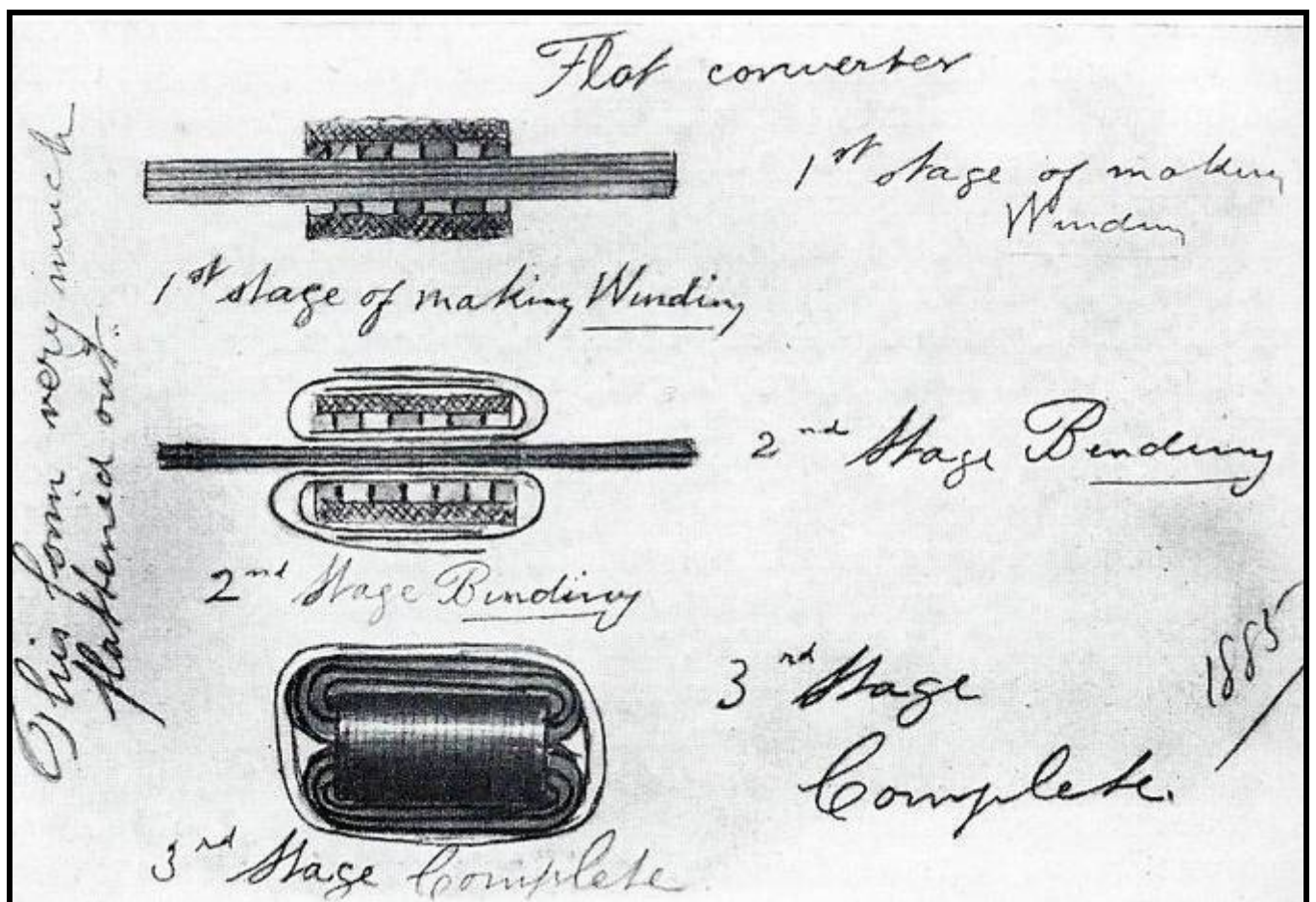
Gertrude Ince

The story of Basti (as he was known to the family) and his courtship and marriage to Gertrude is told in detail in the biography written by his widow*

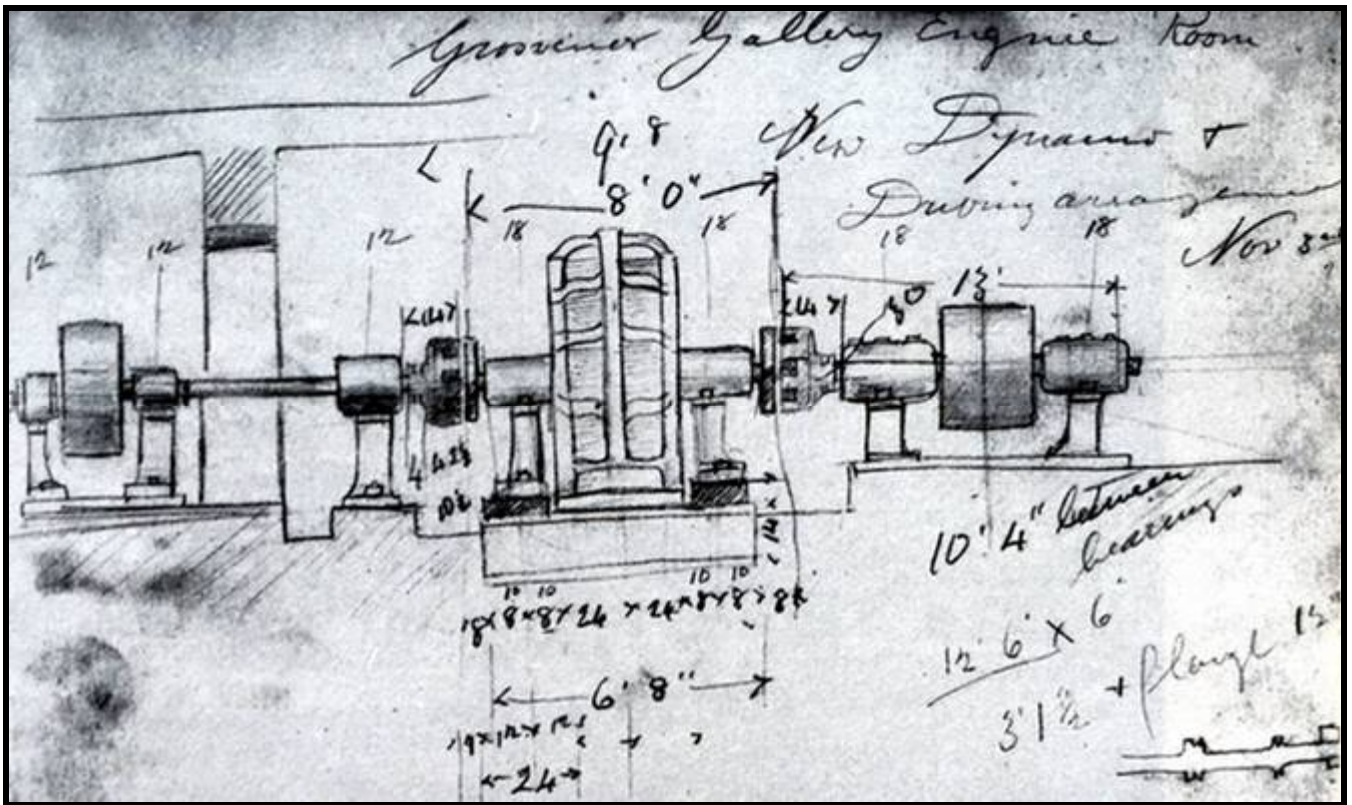
*1934 *The Life and Letters of Sebastian Ziani de Ferranti, Gertrude Ziani de Ferranti & Richard Ince*, Williams & Norgate, London



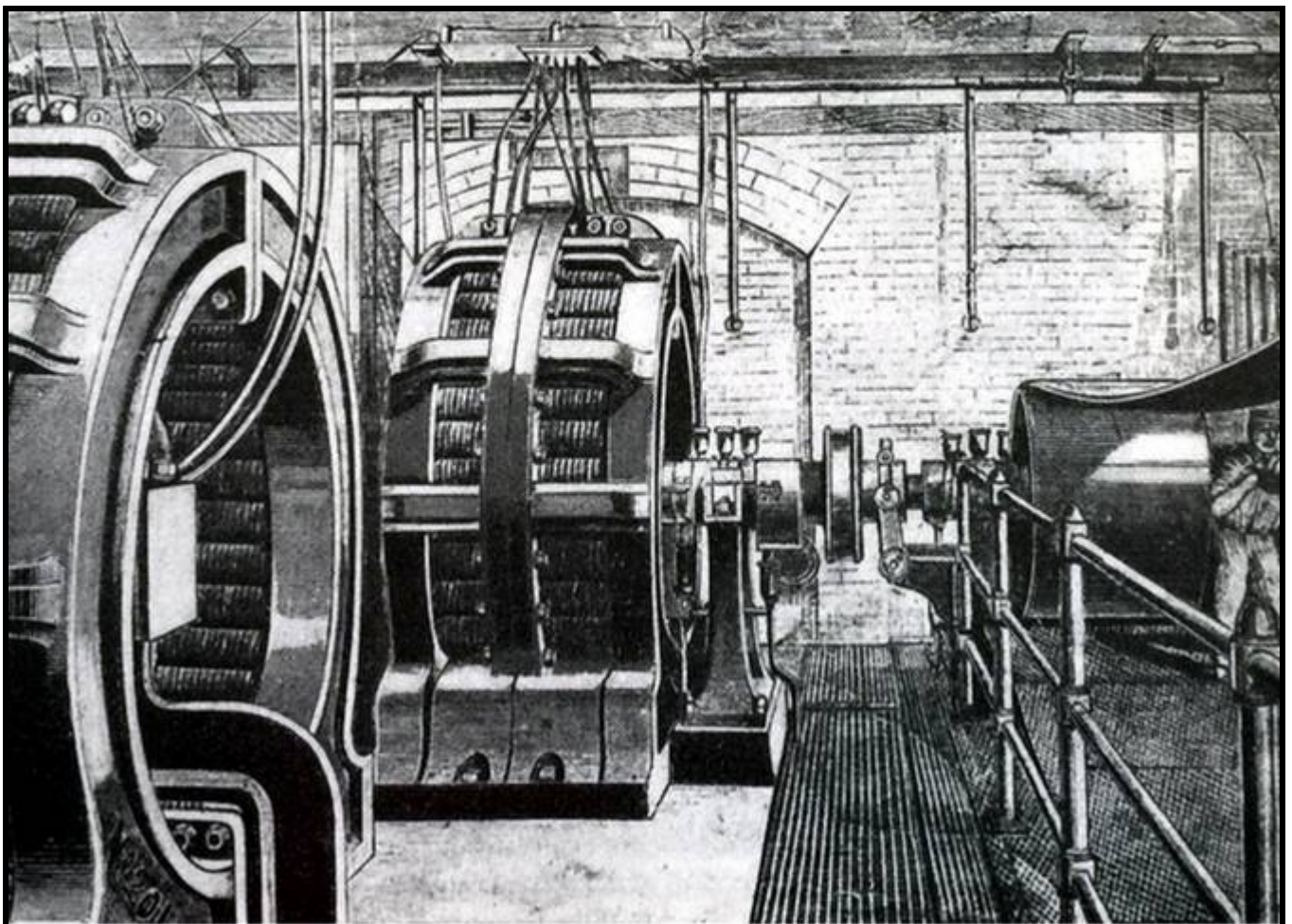
Telephony transformer, 1885, Addenbrooke & Ferranti (Science Museum)



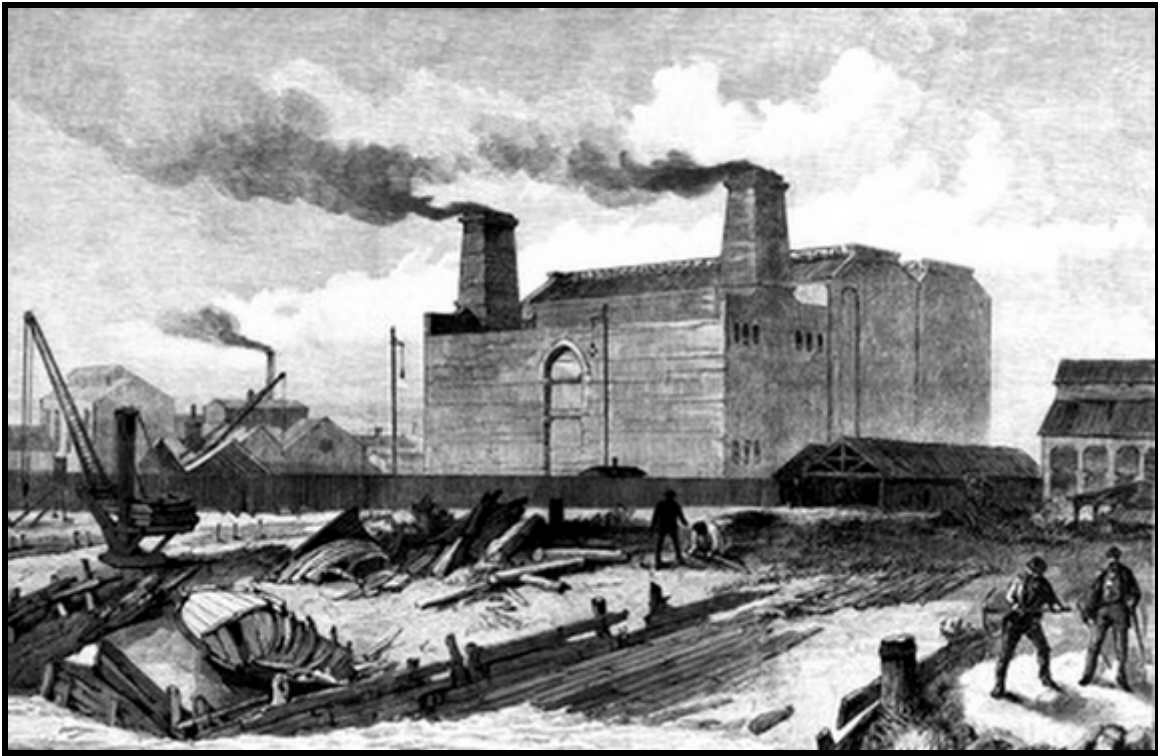
Design from Ferranti's 1885 sketchbook for transformers as used at Grosvenor Gallery and Deptford Power Station



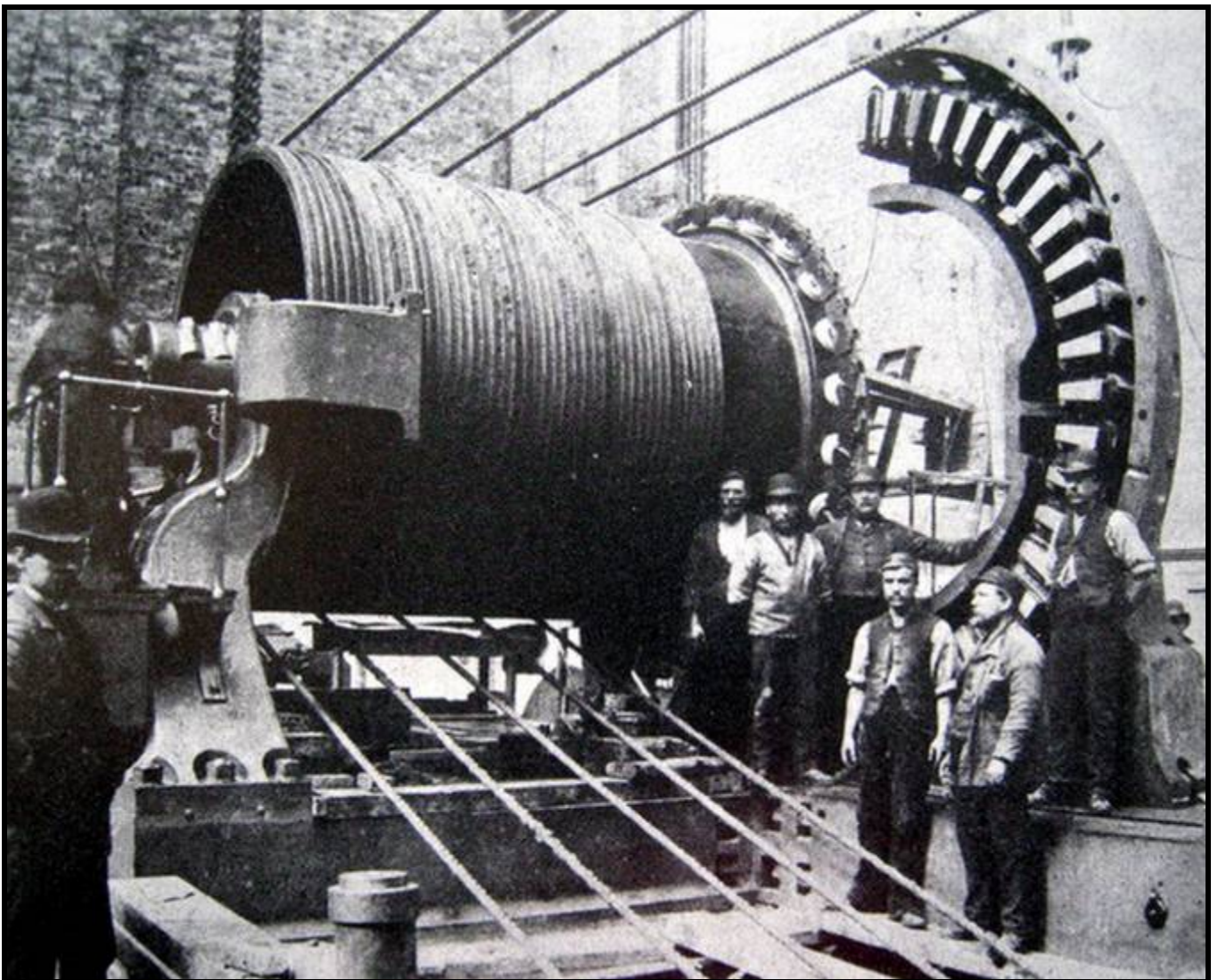
Ferranti's alternator design for Grosvenor Gallery



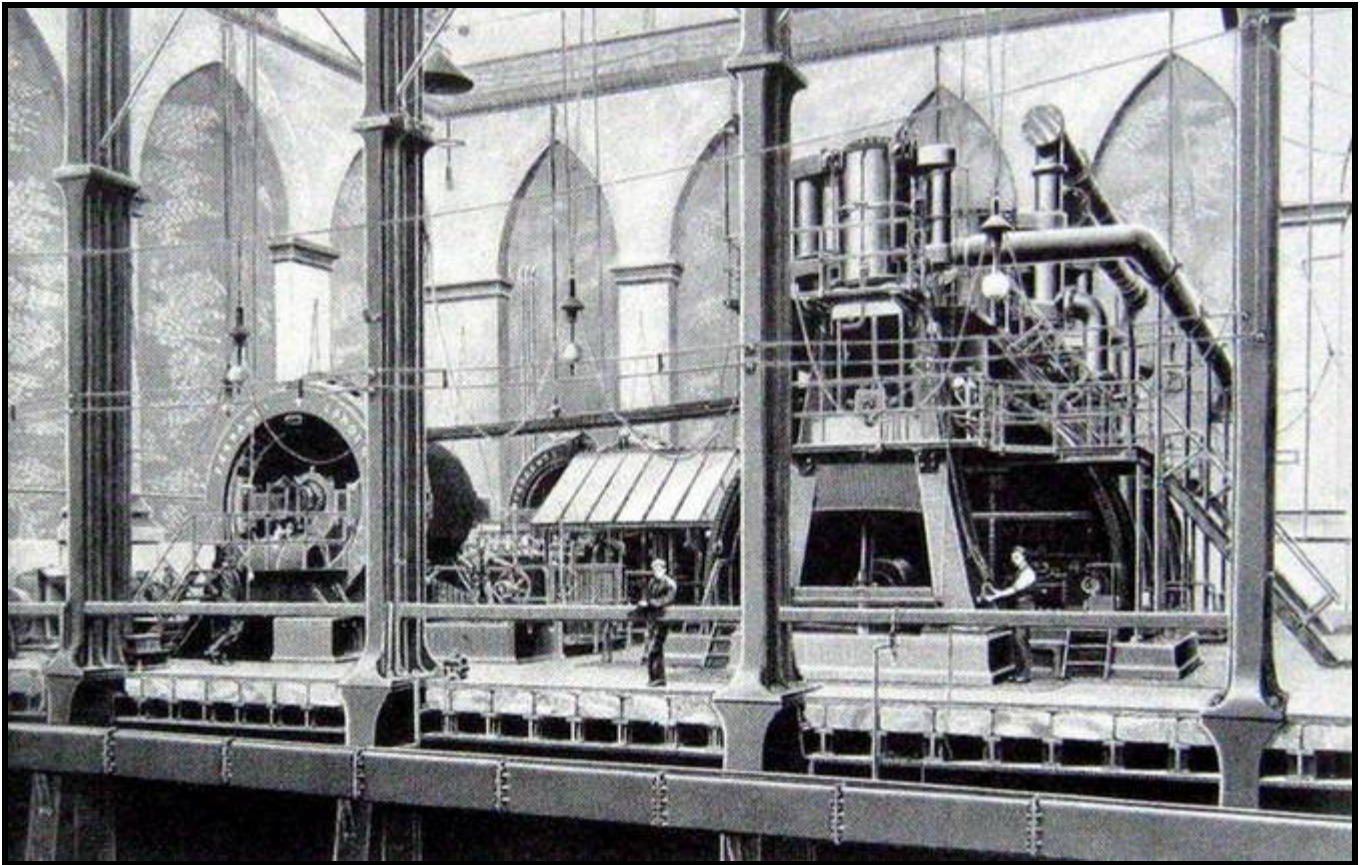
Ferranti 750 hp alternators at Grosvenor Gallery, 1887



Deptford Power Station (Illustrated London News)



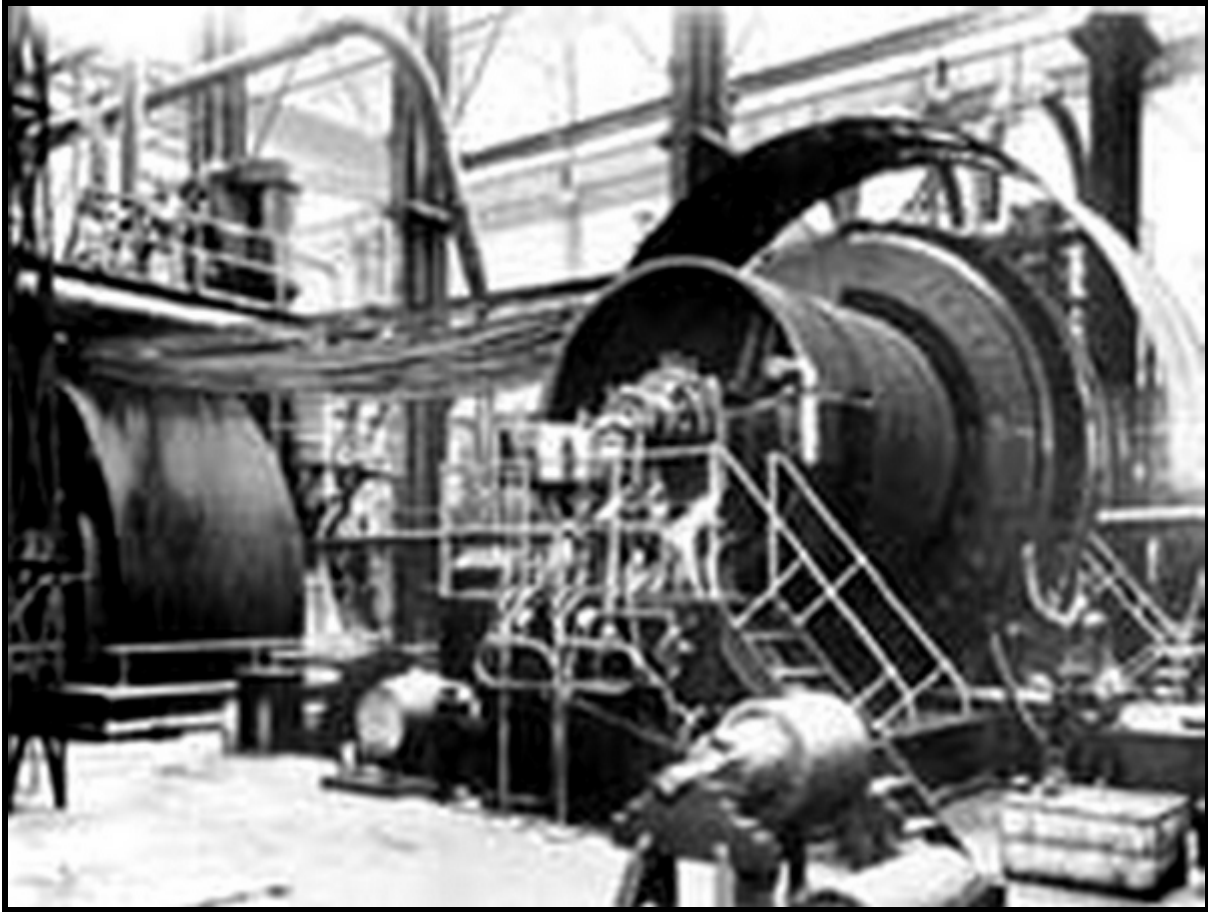
Ferranti alternator under construction at Deptford, 1889



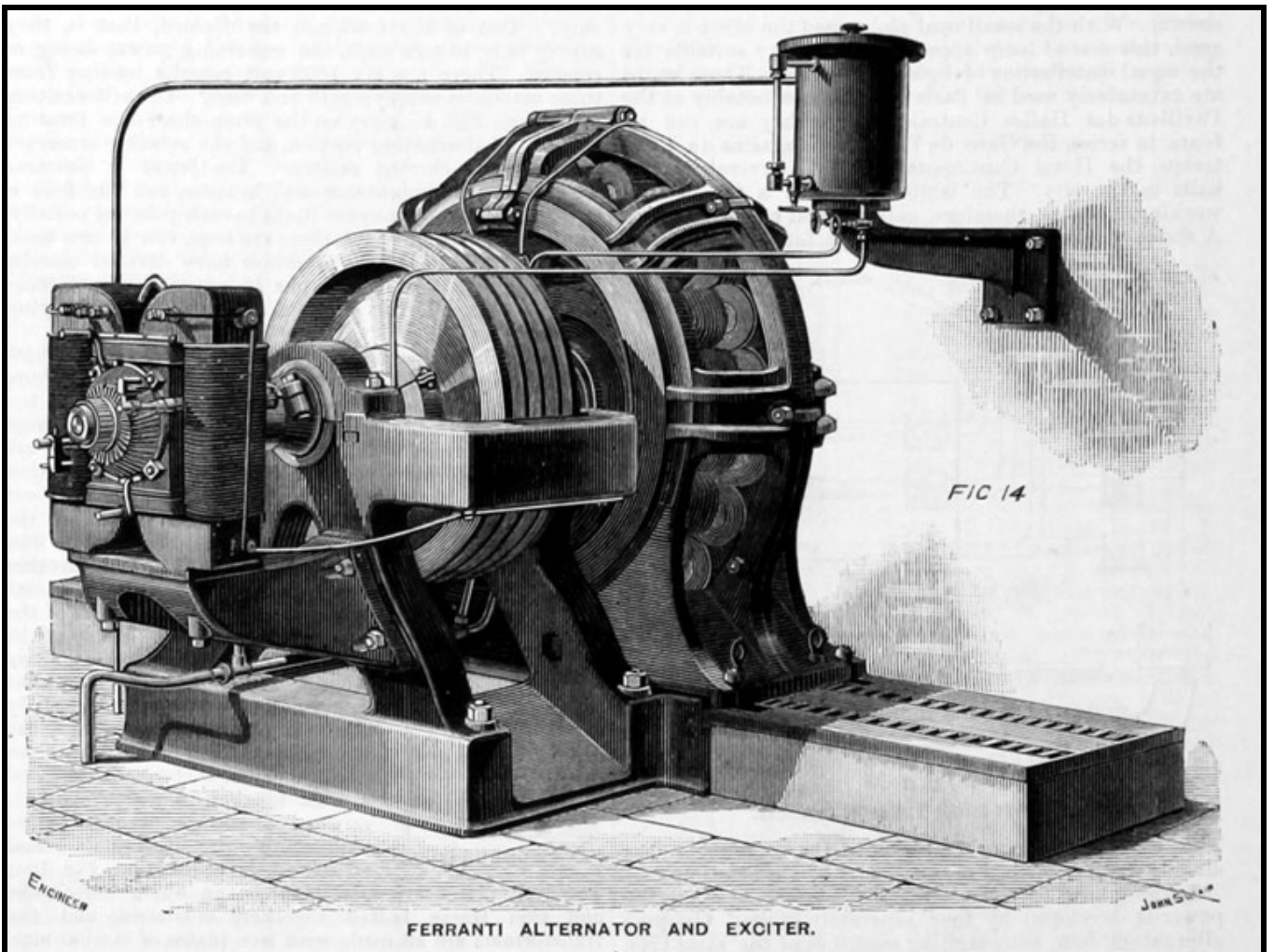
Ferranti 1000 kW alternators & Hick Hargreaves 1500 hp Corliss engines at Deptford, 1889



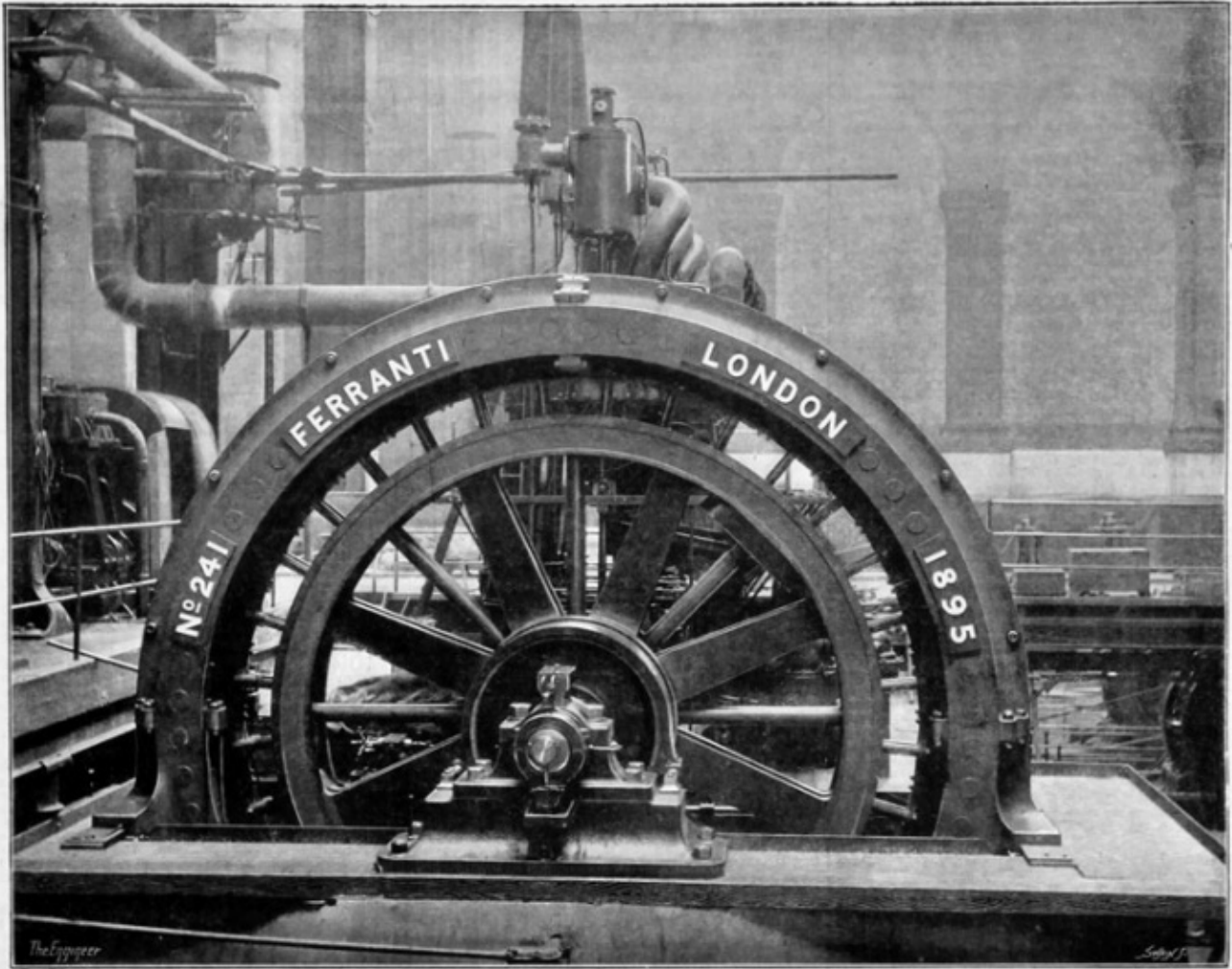
Workmen at Deptford with Ferranti (standing 4th from left in front row wearing long coat)



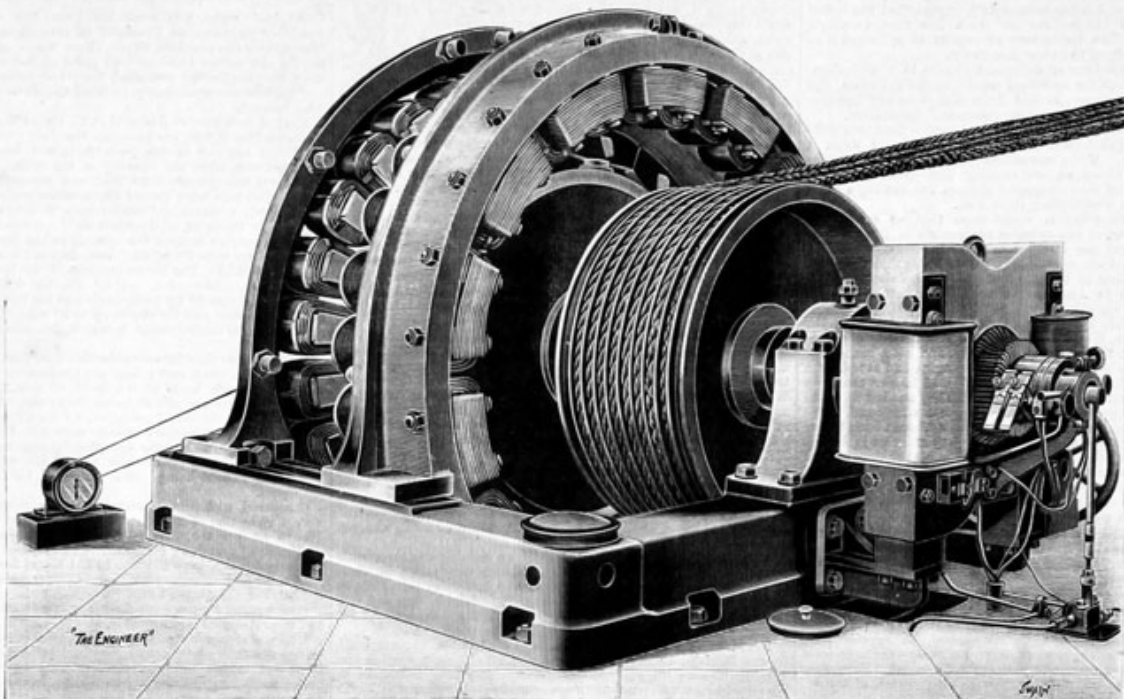
Ferranti alternator



ONE THOUSAND UNIT ALTERNATING DYNAMO, LONDON ELECTRIC SUPPLY CORPORATION
MESSRS. FERRANTI AND CO., ENGINEERS



ELECTRIC LIGHTING OF BARCELONA—300-H.P. FERRANTI ALTERNATOR
MESSRS. S. F. DE FERRANTI AND CO., LONDON, ENGINEERS



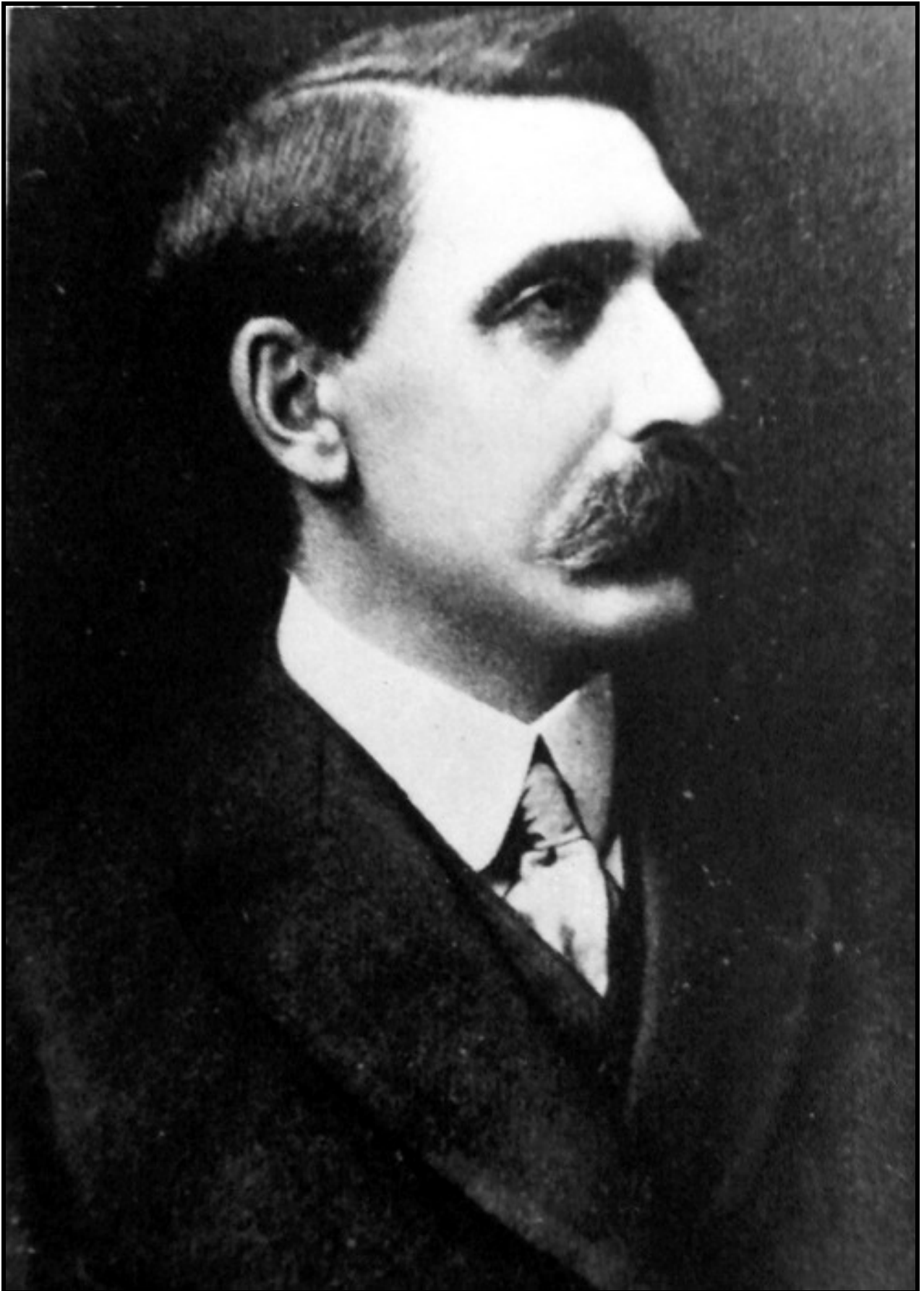
THE SAFETY DEMONSTRATION



Demonstration to prove the safety of the Ferranti cable

A contemporary report describes the safety test:

“Ferranti’s proposal for a concentric cable with the outer conductor earthed provoked tremendous criticism from fellow engineers and the Board of Trade. It was however a trait of Ferranti (rather like Edison) that once he determined he was right, there was no changing his mind. To demonstrate the safety of his proposed cable he arranged a frightening demonstration. His assistant, Harold Kollé stood on an earthed copper plate, holding a cold chisel to the live mains in his bare hands. Another assistant using a sledge hammer drove the chisel through the conductors resulting only in the blowing of the main fuse link. Kollé, when asked if he had been frightened replied yes, because the other guy had not used a sledge hammer before.”



Sebastian Z de Ferranti

The London Electric Supply Corporation Limited,

3, ADELPHI TERRACE, LONDON, W.C.

ELECTRIC LIGHTING.

HIGH PRESSURE SYSTEM vs. LOW PRESSURE SYSTEM.

The Corporation supplies Electrical Energy on the High Pressure System by Meter.



THIS SYSTEM, when properly arranged and controlled, as it is by this Corporation, is equally as safe as the Low pressure system, besides which it has the great advantage of giving an

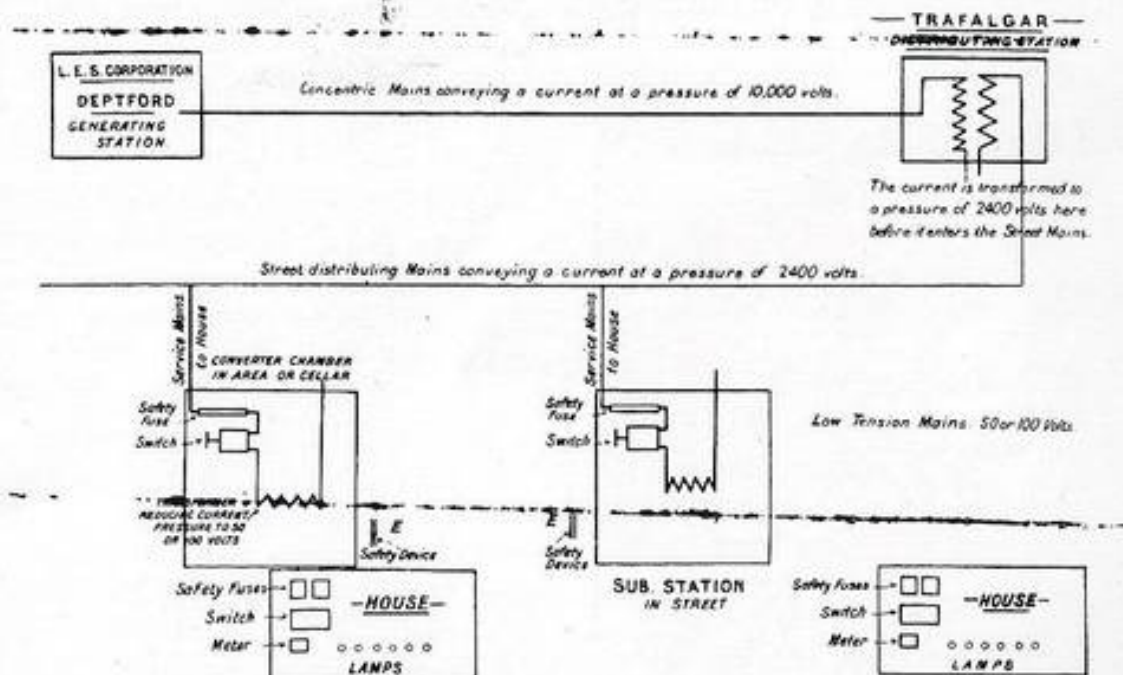
EQUAL AND REGULAR LIGHT

throughout the whole of the premises, however distant the farthest lamp may be from the point of supply.

An idea appears to exist that the High pressure system is more dangerous than the Low pressure system. This is erroneous. The following is the opinion of Mr. W. H. PEARCE, F.R.S., the Engineer-in-Chief and Electrician to the General Post Office, as expressed by him in his address as President for the year, at the Meeting of the Institution of Electrical Engineers, held on Thursday, the 26th January, 1893.

"The prejudice against High pressure is still strong, it is thought to be unsafe, but time and experience will eradicate this impression as they ultimately eradicate every fallacy."

The following is a diagram of the system and connections.



It will be seen that the High pressure at the point of entering the Consumer's premises is Reduced to a pressure of 50 or 100 volts, which is similar to the pressure of the Low or Continuous Current system.

At no point are the High pressure supply wires in contact with the Low pressure service wires.

This Corporation supplies current to H.R.H. THE PRINCE OF WALES, at Marlborough House, a large number of the Nobility, Clubs, Hotels, Theatres, &c., &c., where a good and continuous light is the first consideration.

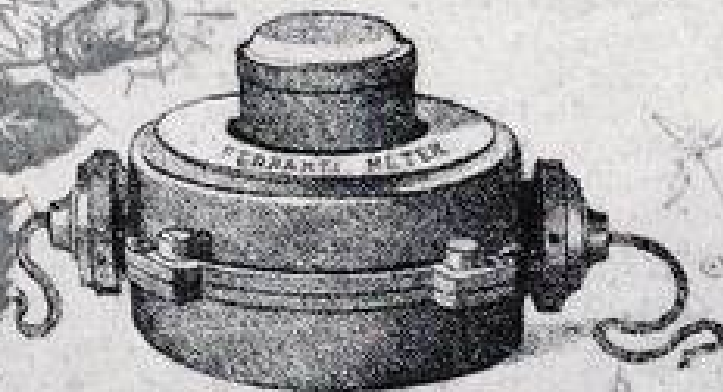
SPECIAL TERMS ARE QUOTED TO LARGE CONSUMERS AND TO THOSE USING THE LIGHT FOR UNUSUALLY LONG HOURS.

[P.T.O.]

FERRANTI

PATENT.

ELECTRICITY METER.



HOUSE & SHIP FORM

INVENTOR AND
MANUFACTURER

S. ZIANI DE FERRANTI

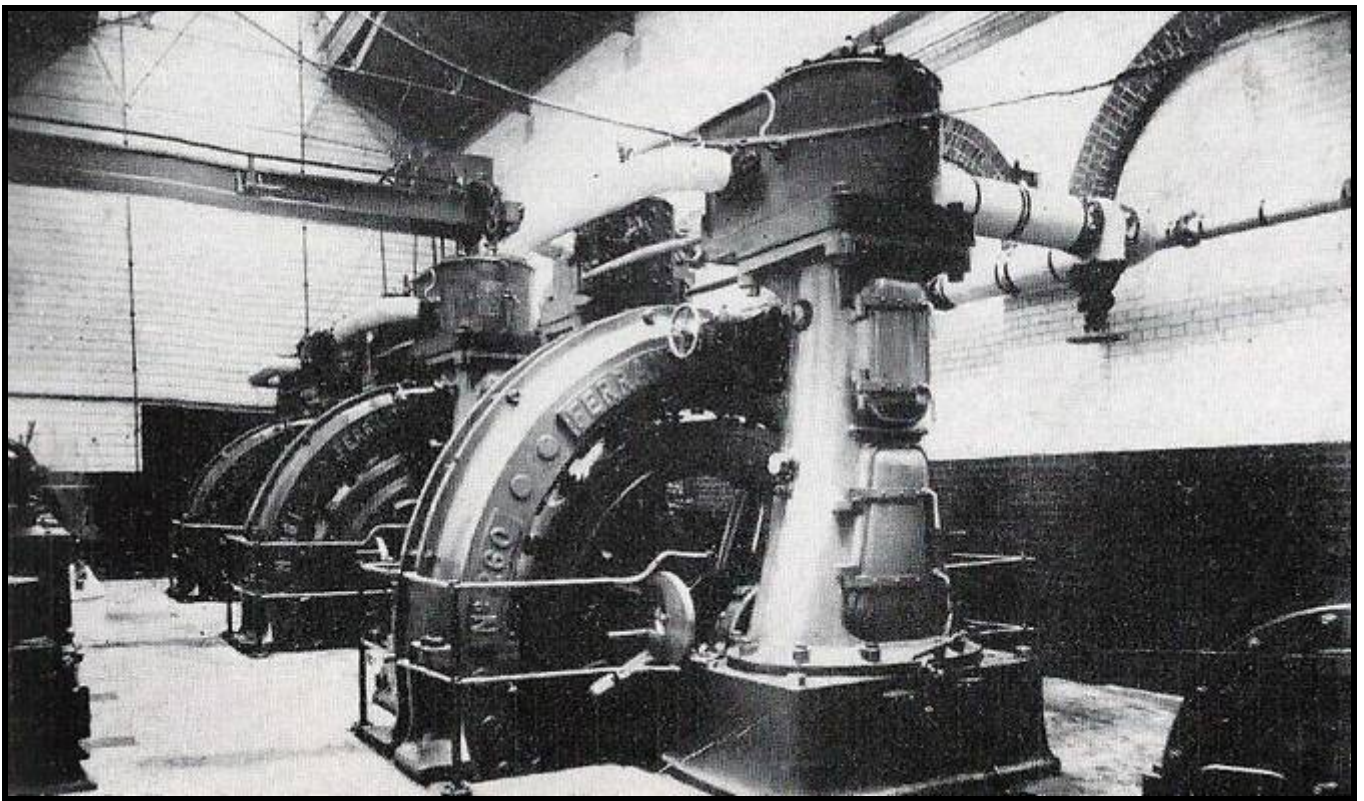
Office, ST. BENET CHAMBERS, Fenchurch Street.
Works, 57th HATTON GARDEN, E.C. * LONDON.

1884 to 1886

Ferranti Patent Electricity Meter, pamphlet c.1884

Ferranti was a prolific inventor and he designed induction furnaces (1887), a multiple steam pipe distributor (1891), and various types of mains cables (from 1885 to 1896). Then in 1894 he then took an interest in arc lighting rectifiers and slow speed alternators and their associated switchgear. He also invented a spectacle making machine and regularly made these for Francis Ince (his father-in-law), Colonel Crompton's wife and Sir William Preece.

FERRANTI AND THE STEAM TURBINE



125 kW steam-alternators (combined Ferranti- engine & alternator) at Hammersmith, 1896

From 1895 to 1918 Ferranti took a particular interest in reciprocating steam engines which had fascinated him from childhood. He embarked on the manufacture of steam engines to power his alternators. Then, it is thought that seeing the Parsons radial steam turbine in operation he recognised its potential and went on to make significant improvements in its manufacture and operation.

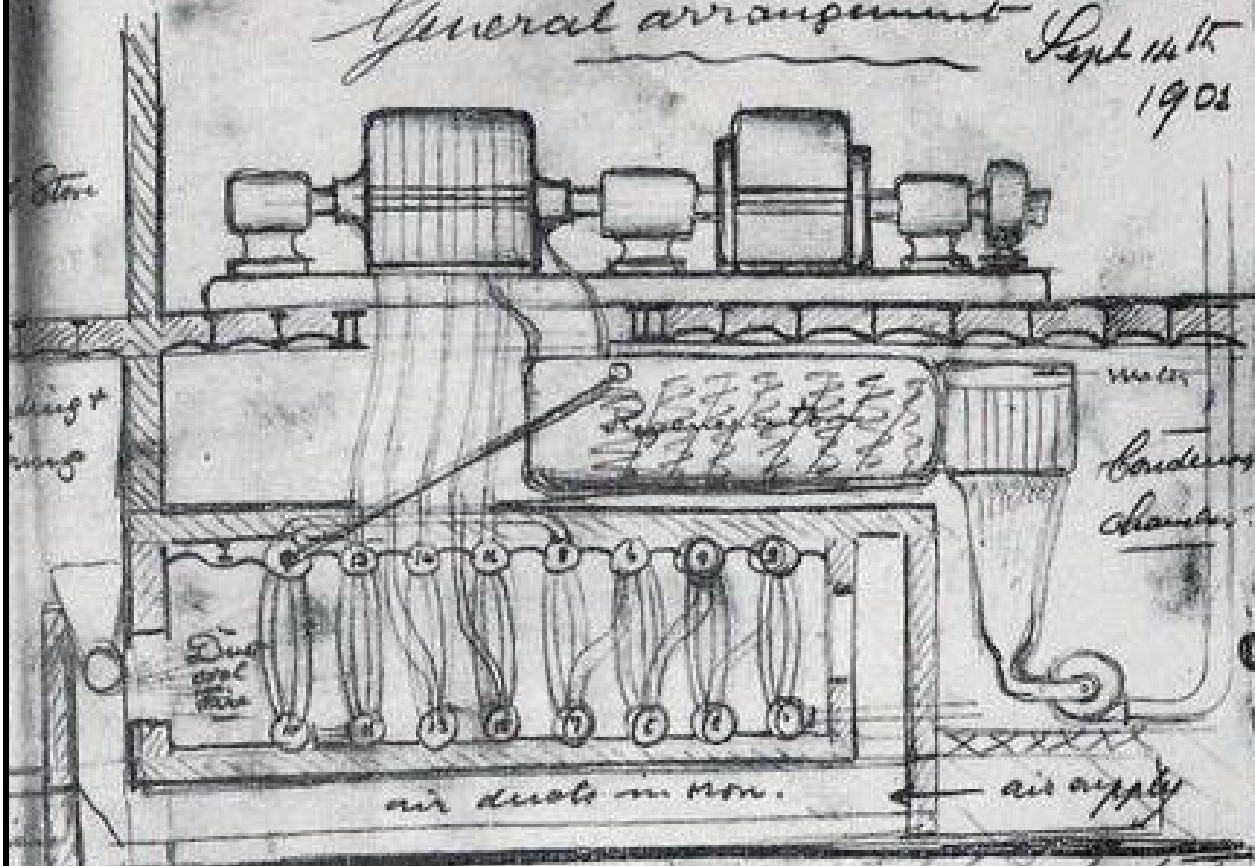
In 1904, Ferranti also designed a low resistance steam stop valve which proved a great success being manufactured by the firm of Hopkinson and earning him a large sum of money in royalties.

Turbines

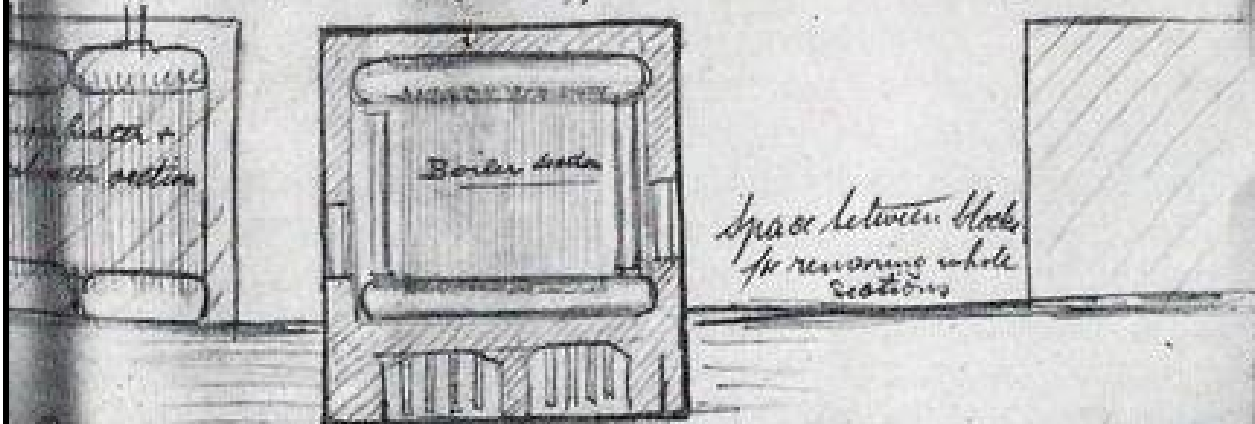
S. L. F.

General arrangement

Sept 14th
1902



(note - air ducts should go in opposite direction to hot gases.)



Disposition of boiler reheater + water heaters, also of air heaters in flues

to following combustion may be used.

A schematic diagram showing a series of vertical pipes representing boiler and water heaters. The pipes are arranged in a row, with some having horizontal sections. An arrow labeled 'Fire' points to the right, and another arrow labeled 'Water' points to the left. The diagram illustrates the flow of fire and water through the boiler and water heaters.

Early Ferranti design for a steam turbine, 1902

APPENDIX I: SOME FERRANTI AMERICAN PATENTS

(No Model.)

7 Sheets—Sheet 1.

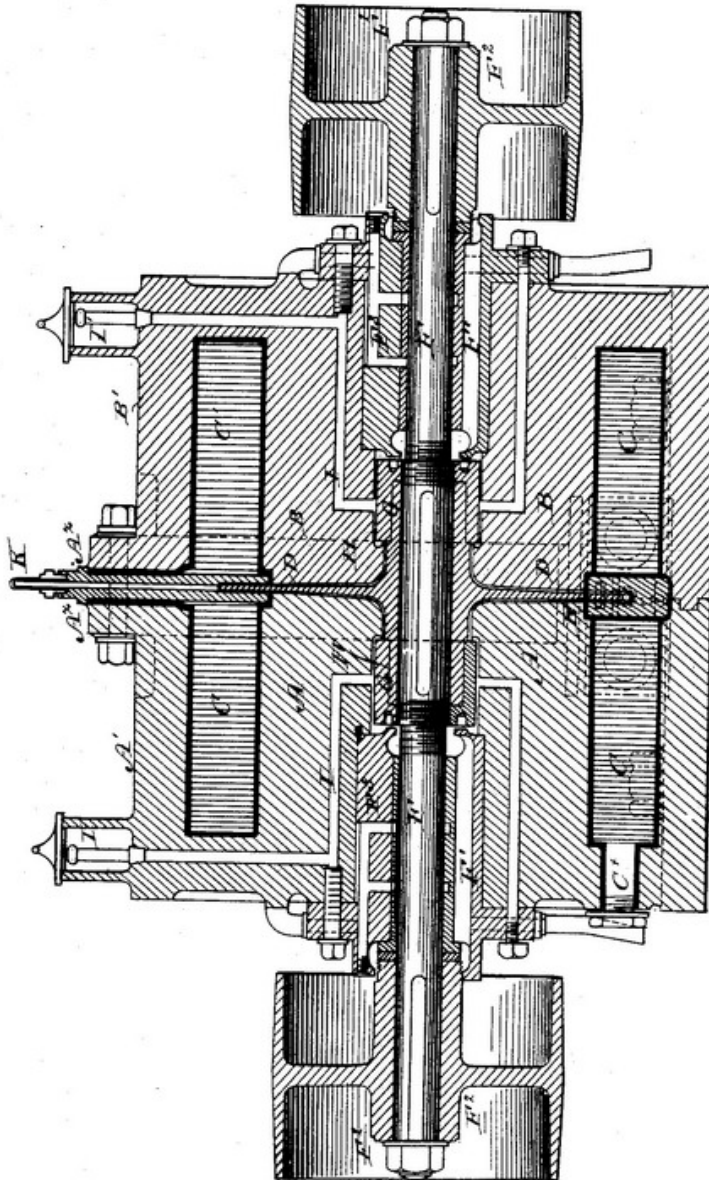
S. Z. DE FERRANTI.

UNIPOLAR DYNAMO ELECTRIC MACHINE.

No. 341,097.

Patented May 4, 1886.

Fig. 1.



WITNESSES

Ed. A. Neuman.
Ch. C. Neuman

INVENTOR

S. Z. de Ferranti,
By his Attorneys
Waldron, Hopkins & Dwyer.

(No Model.)

7 Sheets—Sheet 6.

S. Z. DE FERRANTI.

UNIPOLAR DYNAMO ELECTRIC MACHINE.

No. 341,097.

Patented May 4, 1886.

Fig. 13.

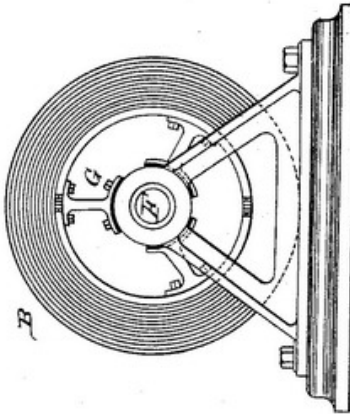
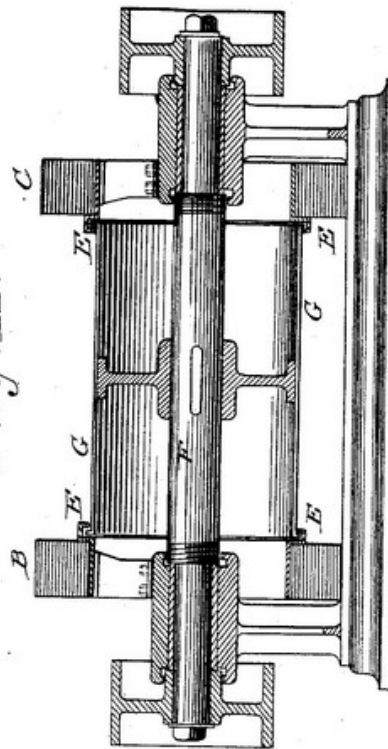


Fig. 12.



WITNESSES

Ed. A. Newman.
W. C. Newman

INVENTOR

S. Z. de Ferranti,
By his Attorneys
Baldwin, Hopkins & Payne

(No Model.)

7 Sheets—Sheet 6.

S. Z. DE FERRANTI.

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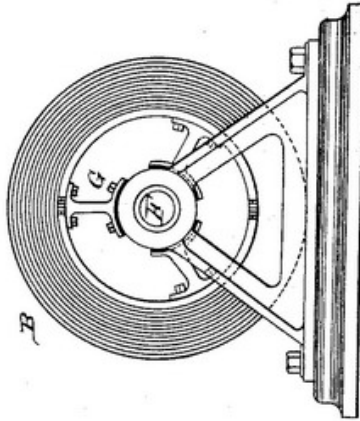
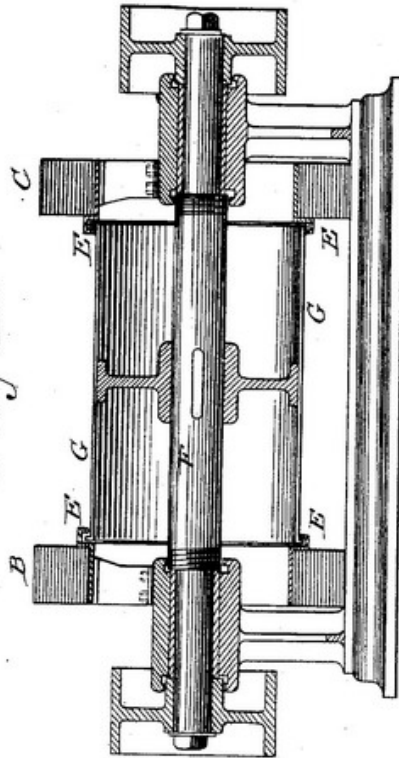


Fig. 12.



WITNESSES

Ed. A. Newman.
A. C. Newman

INVENTOR

S. Z. de Ferranti,
By his Attorneys
Baldwin, Hopkins & Payne

APPENDIX II: EXTRACTS FROM FERRANTI LETTERS & SKETCHBOOKS

with my whole
heart, and I send
you a great many
kisses for your birth-
= day.
Your dear boy
Sebastian
Arlon 19th December 1842

Extract from Ferranti's first letter, written in 1872 at the age of 8, to his mother

S Stanislaus
April 20th 1875
My dear Mama
I received
your nice letter. Madz
in brought the engine
while I was out I
also received the statue
of st josephe. thank
sister Winifred for it.
I am very glad to hear

Extract from Ferranti's letter, written in 1874 at the age of 10, to his father



St Augustines College
Bramsgate Dec 27th

My dear Mama

I was very pleased
to receive your's and Vanda's letter on
Saturday. Now is it you do not
mention anything about Vanda's
Trips as I suppose she got some.
The first and most impor
tant thing I have to tell you
is. . . . The holidays commence
on the 21st of December 1878.
they last about two weeks and
I think are up on the 5th of Jan

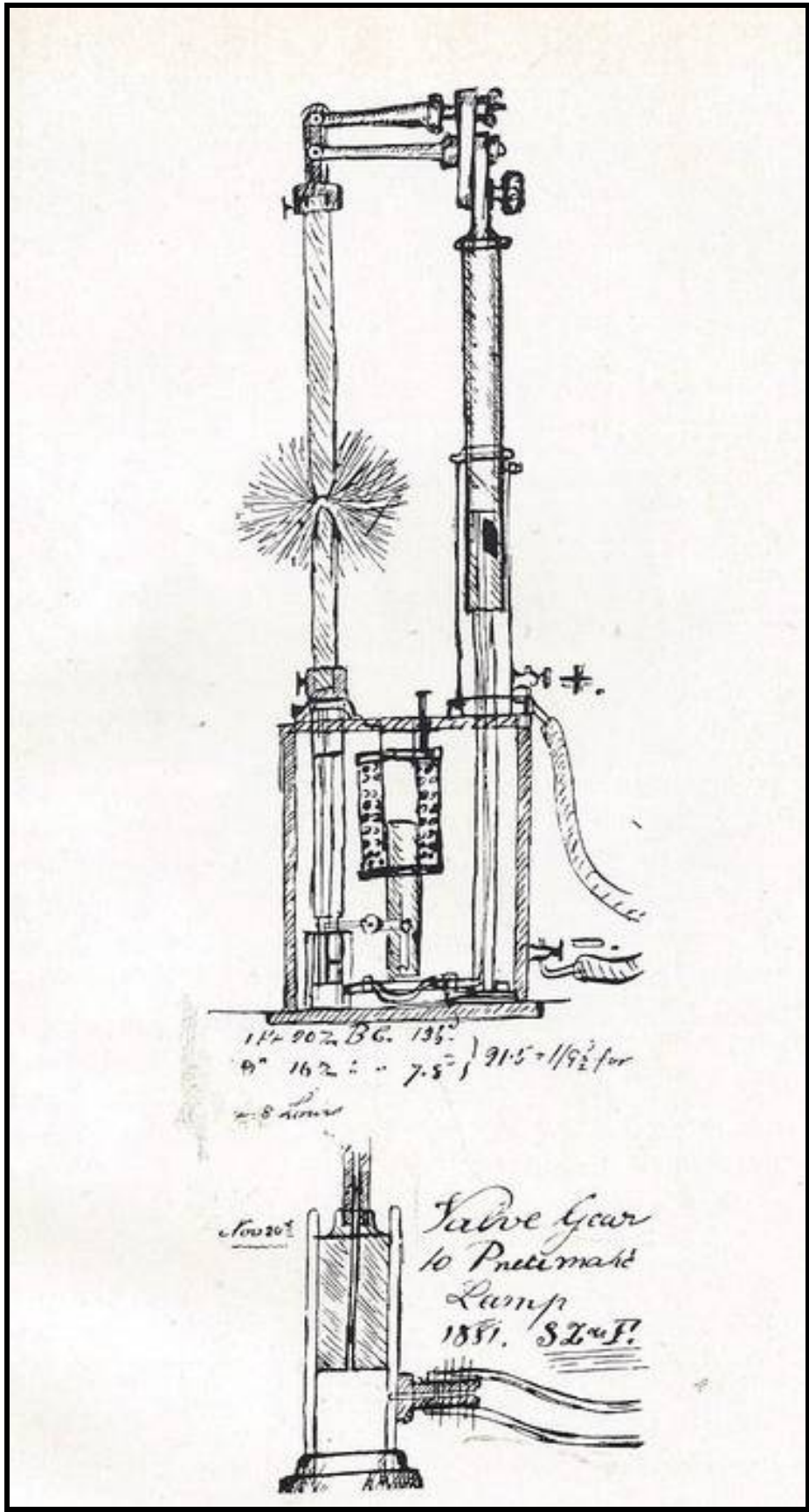
Extract from Ferranti's letter, written in 1878 at the age of 13, from College to his mother

March 1880.

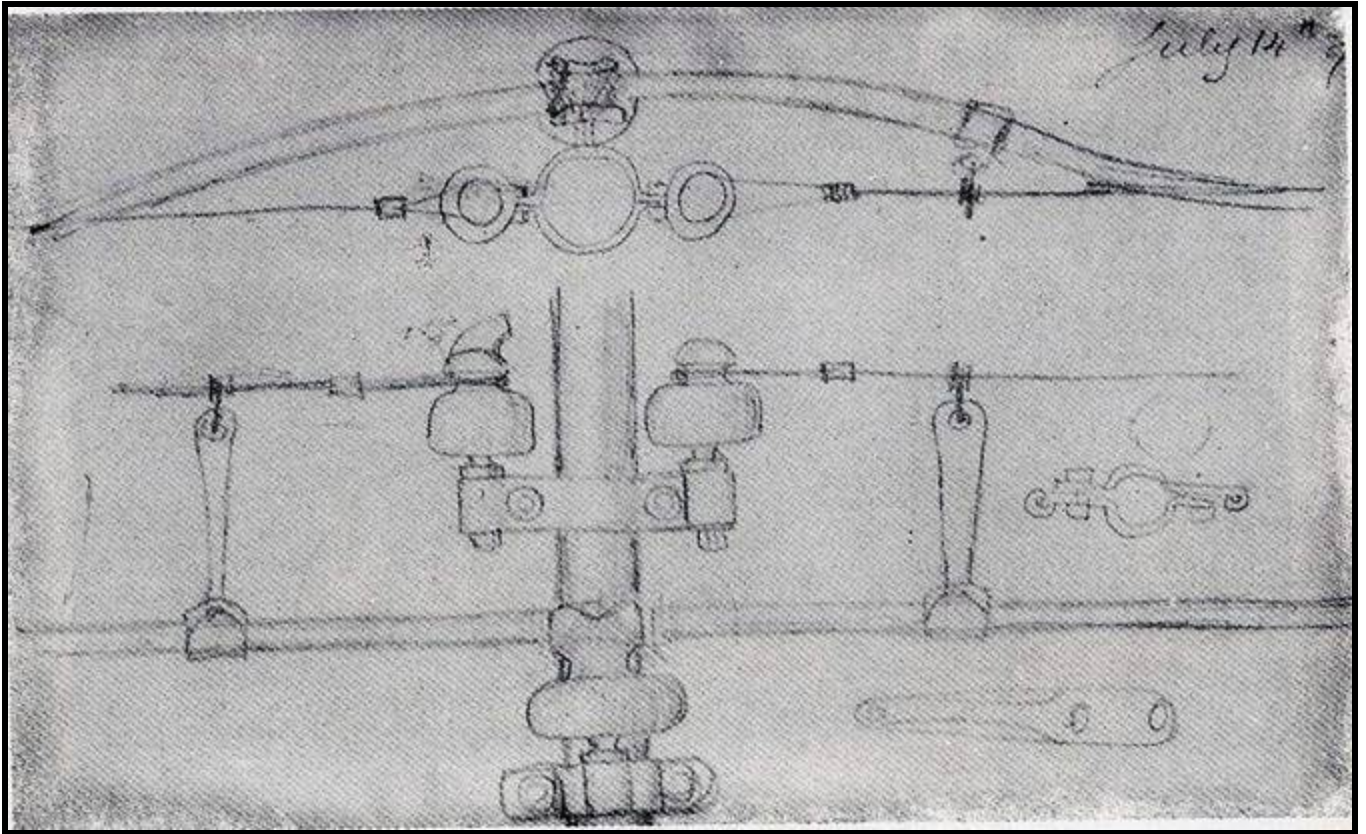
My dear Father,

I am very sorry
that my accident - has caused you
so much anxiety. But you can
now console your self as no injury
has been done to my eyes & there are
now left only a few little marks
which a short space of time will
render no longer visible. I will
now tell you exactly how it happened.
I had broken a carton of one of my
batteries & wished to pour it again
as it was a good one. In order to do
this I made two holes in it A & B.

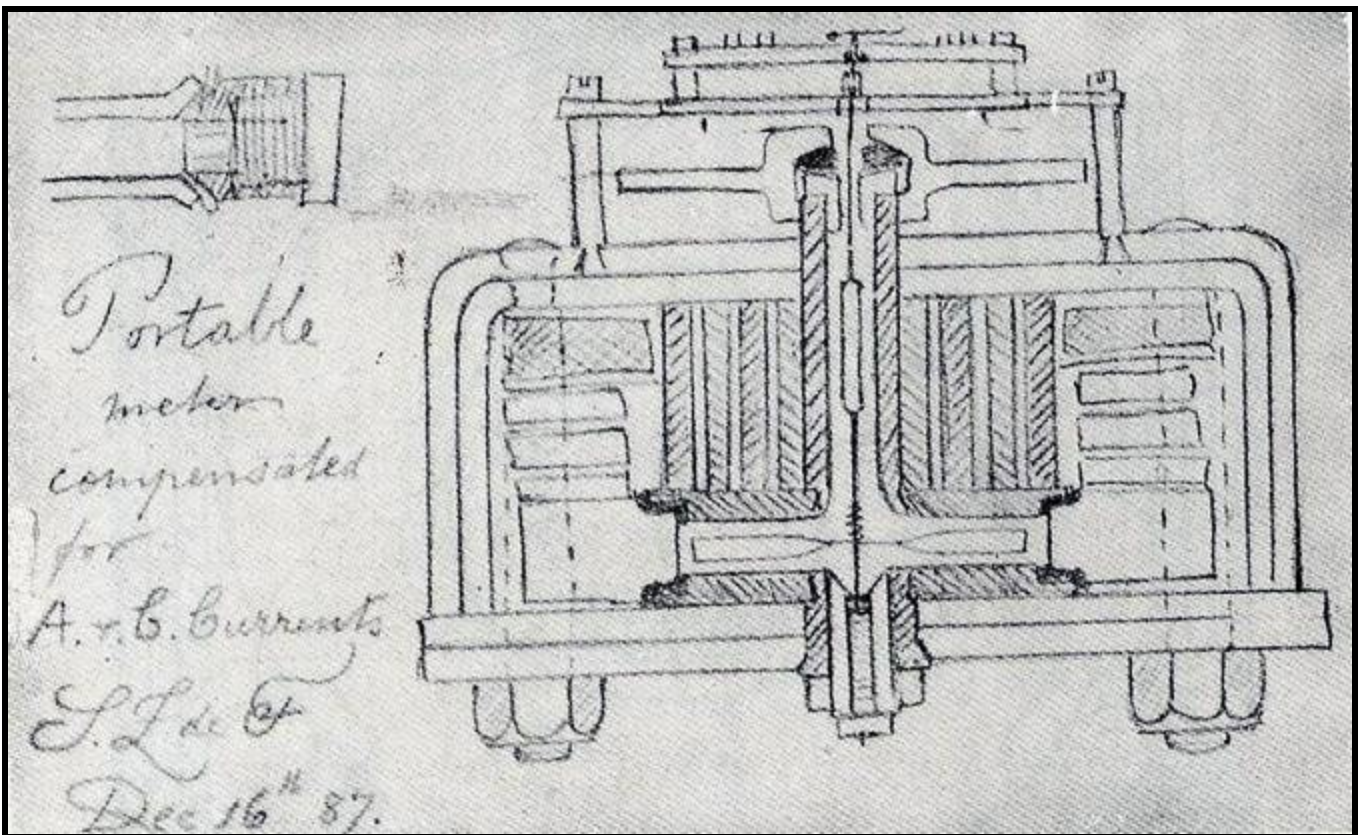
Extract from Ferranti's letter, written in 1880 at the age of 16, to his father



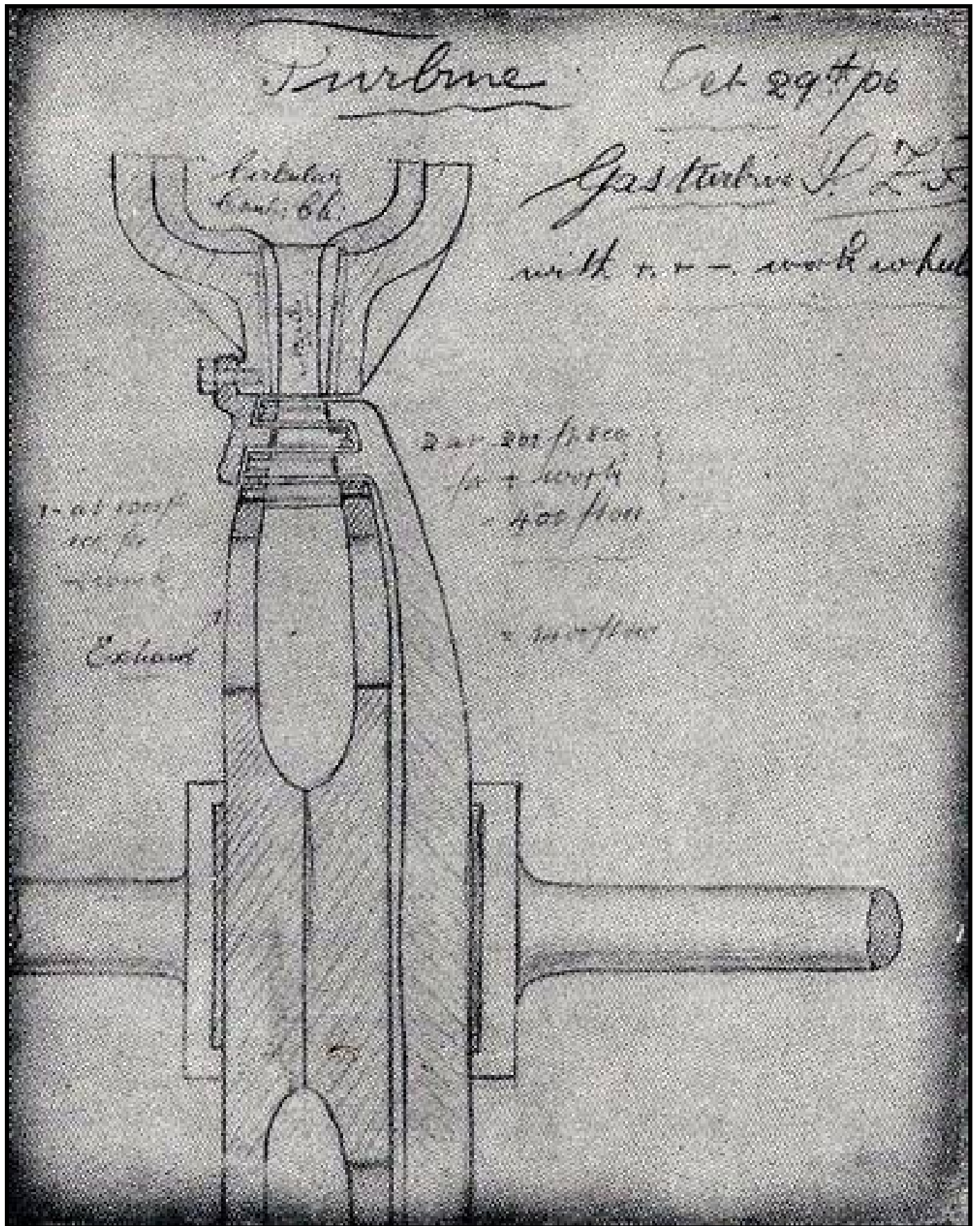
Ferranti's design for an arc lamp, 1881



Ferranti's design for a Suspendor Grip for Cables

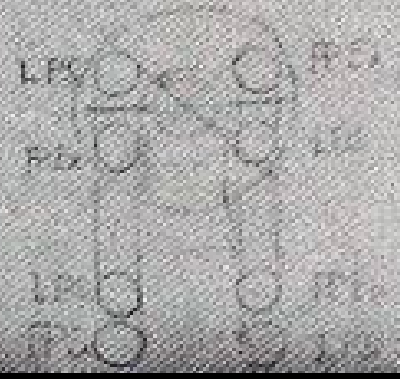
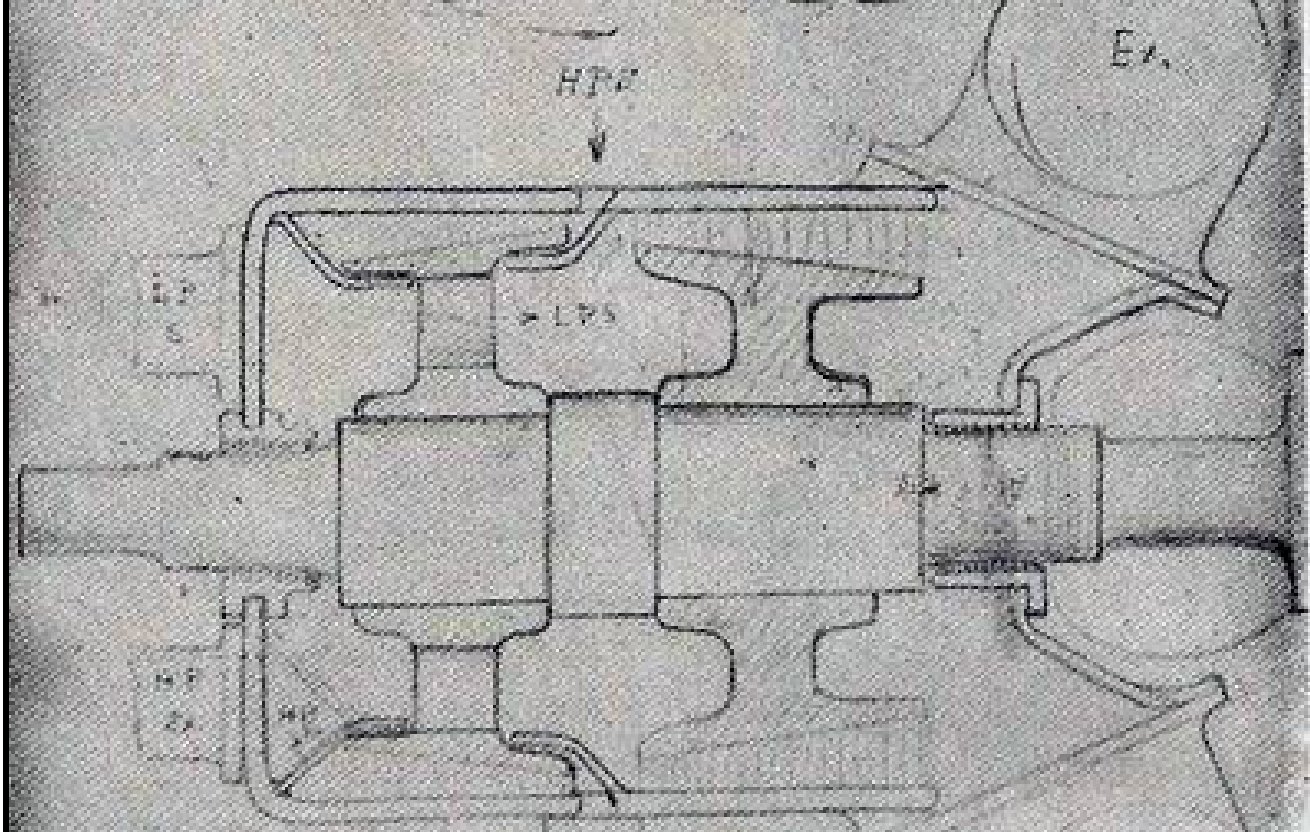


Design sketch for a Portable Meter, 1887

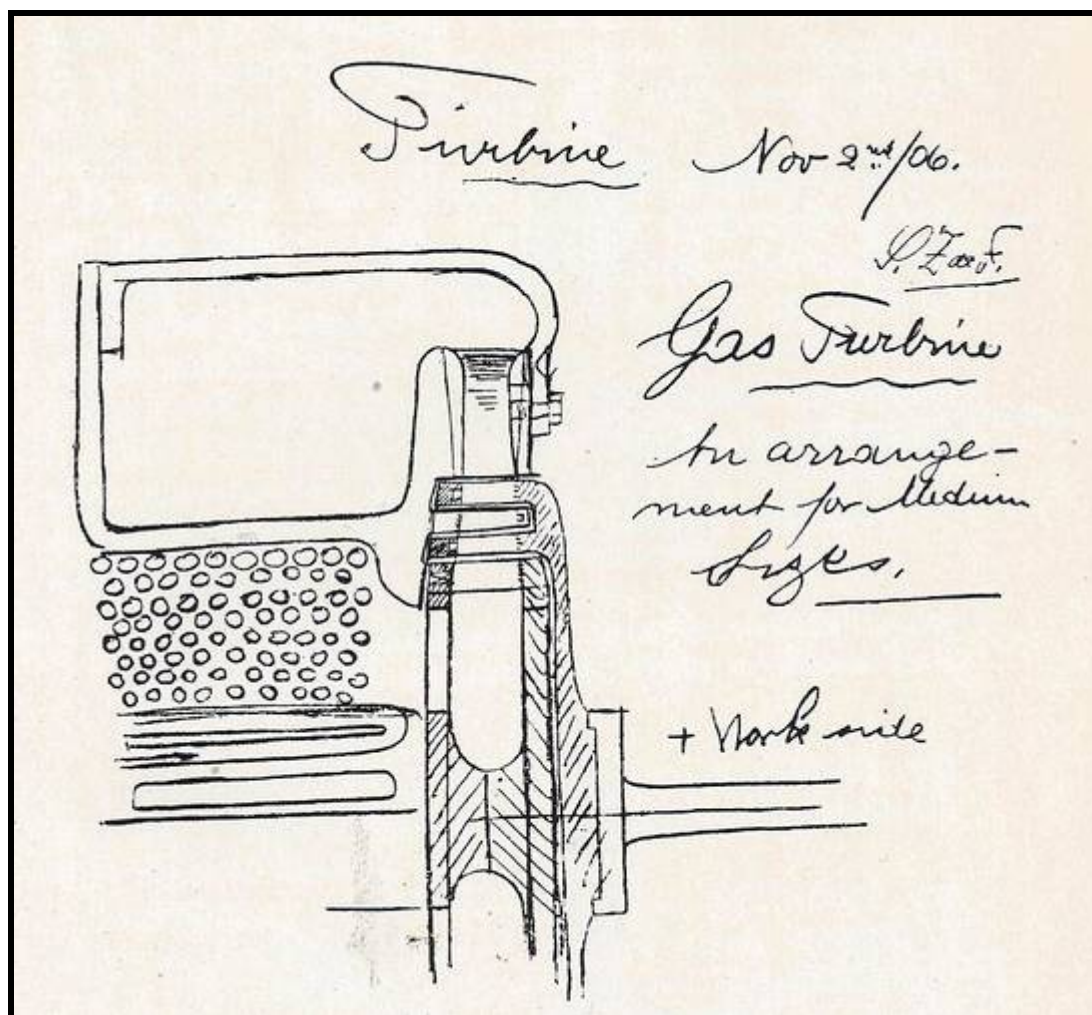


Design sketch for a Gas Turbine, 1906

Turbines. Jan 28/08
Steam re-superheating. P. 10.



Design sketch for a Steam Re-Superheating Turbine, 1908



Sketch design for a Gas Turbine, 1906

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* The 1956 reprint is available on the internet as four PDFs

1946 *S Z de Ferranti- his influence upon electrical development*, W L Randell, Longmans Green, (Reprint)

1964 *S Z de Ferranti: Pioneer of Electric Power*, Arthur Ridding, Science Museum, HMSO London

1987 *Electricity Supply in the United Kingdom: A Chronology (to 31st December 1985)*: The Electricity Council, London, 4th Edition

<http://www.gracesguide.co.uk/Sebastian-Ziani-de-Ferranti>

<http://www.swehs.co.uk/tactive/-X05-0.html>

POSTSCRIPT: FURTHER READING

THE LIFE AND LETTERS OF
SEBASTIAN
ZIANI DE FERRANTI

by

GERTRUDE ZIANI DE FERRANTI, M.R.I.

and

RICHARD INCE

With a foreword by

CAROLINE HASLETT, C.B.E.

Companion I.E.E.

LONDON
WILLIAMS & NORGATE LTD

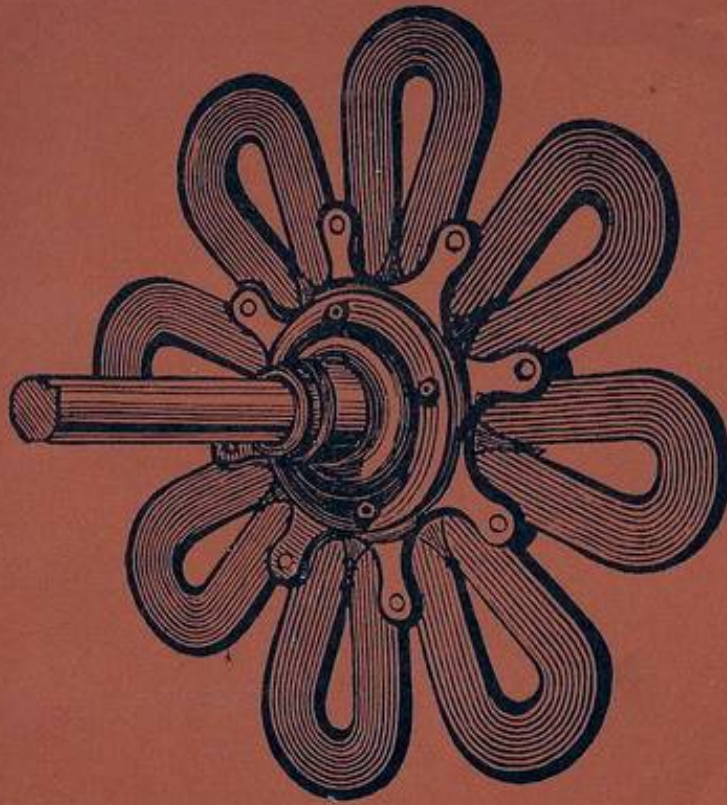
1934 reprinted 1956

S. Z. DE
FERRANTI

—HIS INFLUENCE UPON
ELECTRICAL DEVELOPMENT



W. L. RANDELL



**S.Z.deFerranti
Pioneer of
electric power**

ARTHUR RIDDING

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EPILOGUE



The family grave and memorial in Hampstead Cemetery, with the graves of Sebastian Ziani di Ferranti, Yolanda Julie Ziani di Ferranti (his daughter) and Juliana Ziani di Ferranti (wife)

In 1900, Ferranti became a Member of the Institution of Electrical Engineers and served as President in 1910 & 1911. In 1911 the honorary degree of Doctor of Science was conferred upon him by Manchester University. Then in 1924 he was awarded the Faraday Medal and in 1927 he was elected a Fellow of the Royal Society. From 1882 to 1927 he took out 127 patents. Sebastian Ziani di Ferranti died on the 13th January, 1930.