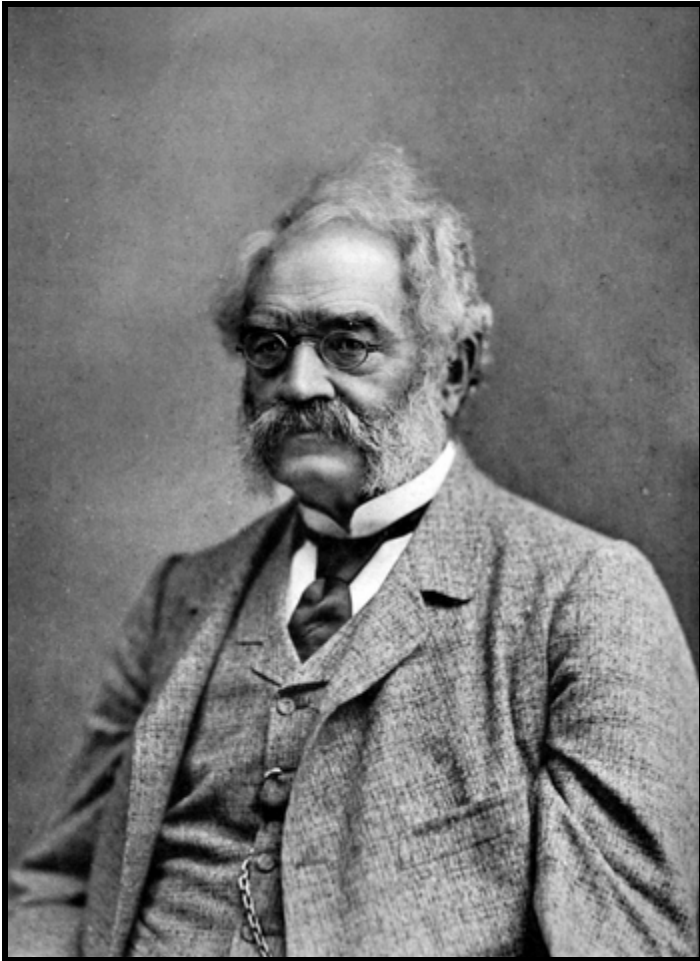


ERNST WERNER von SIEMENS GERMAN INDUSTRIALIST

by Brian Roberts, CIBSE Heritage Group



Ernst Werner von Siemens, 1816-1892

Werner von Siemens was born in Lenthe in Hanover on the 13th December, 1816 the fourth child (of fourteen) the son of a tenant farmer, Christian Ferdinand Siemens (1787-1840), and his wife Eleonore Deichmann (1792-1839).

His hopes of studying in Berlin proved impossible, since his family was highly indebted, and instead he chose to join the Prussian Military Academy's School of Artillery & Engineering. From 1835 to 1838, Siemens trained as an officer, receiving tuition in mathematics, physics and chemistry. Following the death of his parents, he invented an improved process for gold- and silver-plating (sold to Elkington of Birmingham in 1843). He then transferred to the staff of the Berlin Artillery Works and joined the circle of academics at the University.

Around 1845, Siemens improved the indicator telegraph of Charles Wheatstone and went on to develop a complete telegraph system. In 1847, together with Johann Georg Halske (a scientific instrument maker), he founded the firm of Siemens & Halske to manufacture and construct telegraph systems. The company obtained government contracts to build a telegraph network in northern Germany. Then having left the Army, Siemens visited Russia where he planned the telegraph line from St Petersburg to the Crimea (used during the Crimean War). The Russian business proved so profitable that Siemens' brother Carl was made the resident Russian representative and this enabled Werner to conduct research resulting in improvements to the telegraph and underwater cable telegraphy.



Johann Halske



Carl von Siemens



William von Siemens



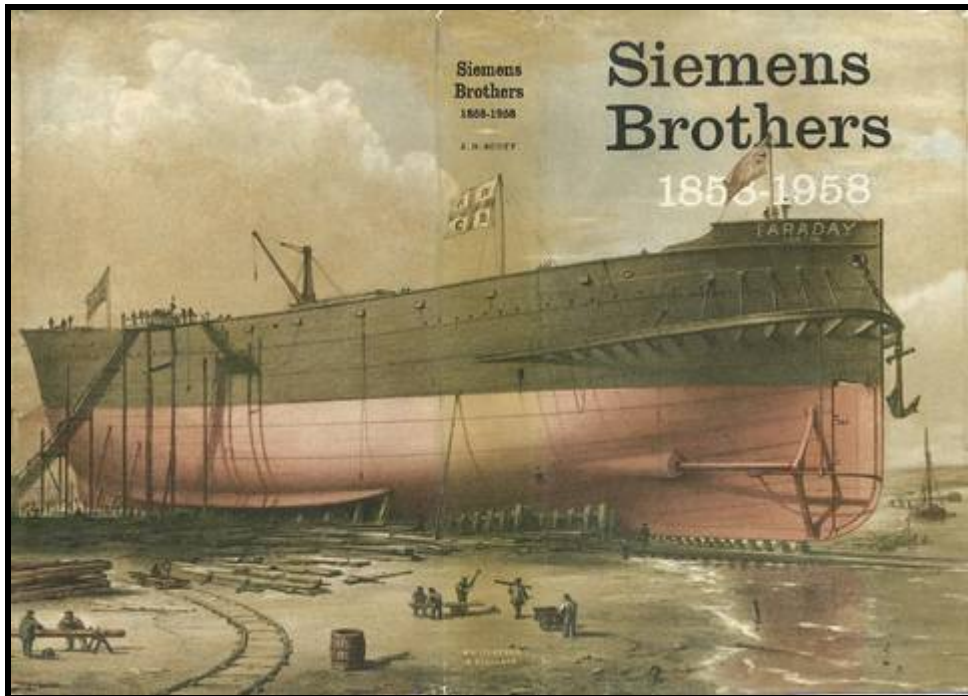


Werner von Siemens with his first wife Mathilde and sons,



Werner von Siemens with his wife and family, c. 1876

Werner was appointed scientific consultant to the British Government which resulted in the formation of Siemens Brothers in London, headed by William (later Sir William) to manufacture and lay underwater cables. The first special cable-laying ship, the *Faraday*, was designed and built, which, after 1875 laid five Atlantic cables in ten years.



The Faraday

Perhaps the most impressive achievement of Siemens Brothers at this time was organising and constructing the Indo-European Telegraph from London via Berlin, Odessa, and Teheran to Calcutta, completed in 1870.



Siemens' London Factory

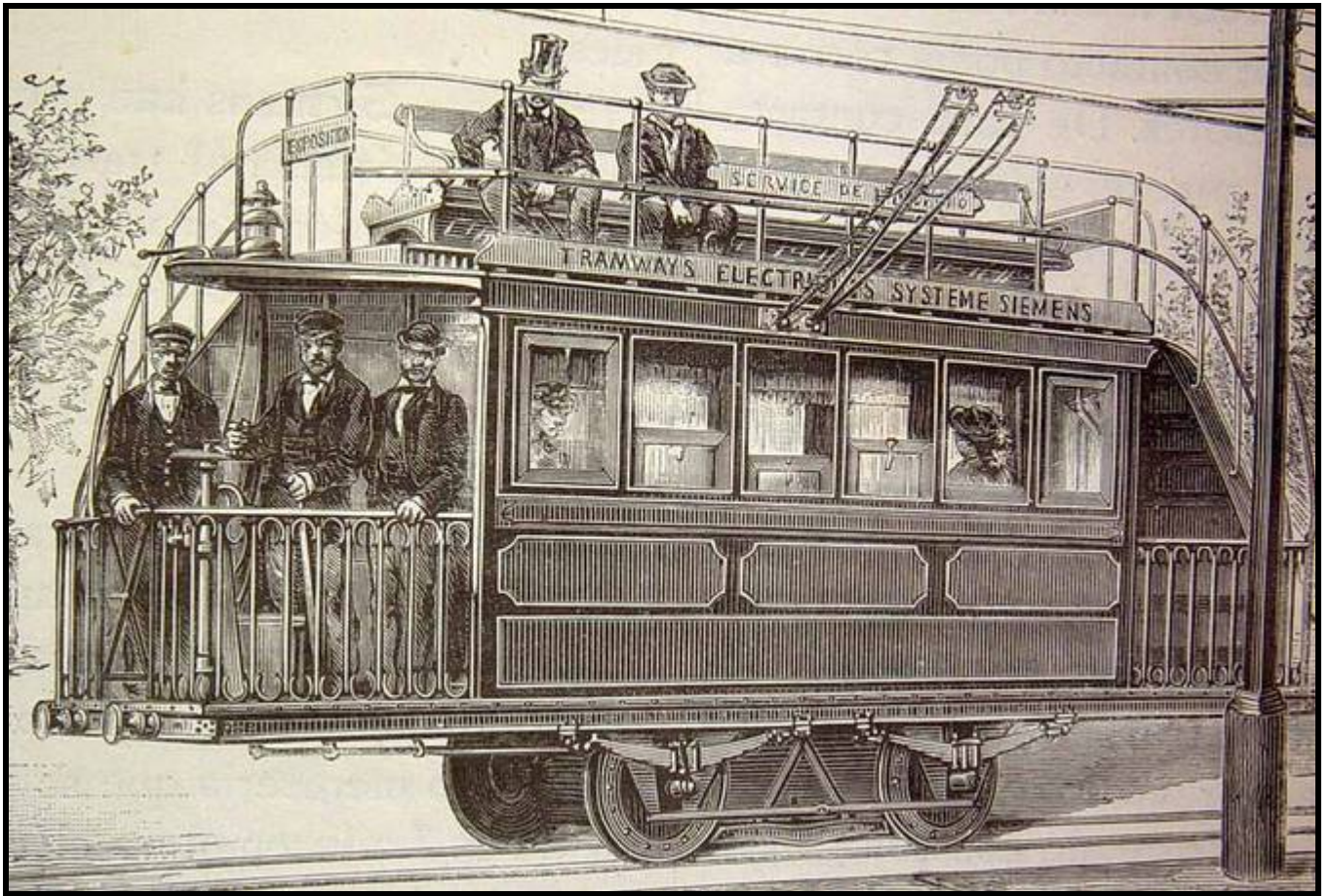
Meanwhile in 1867, Werner made his outstanding contribution to scientific technology with his discovery of the dynamo principle.

Having already introduced the double-T armature, the electromagnetic field, and the external load of an electrical generator in a single circuit.... (he avoided) the costly permanent magnets previously used in the field. Other inventors (Wheatstone and Moses Farmer) discovered the dynamo principle about the same time; but Siemens foresaw the consequences of his *dynamo* for heavy current, or power, uses and developed practical applications.

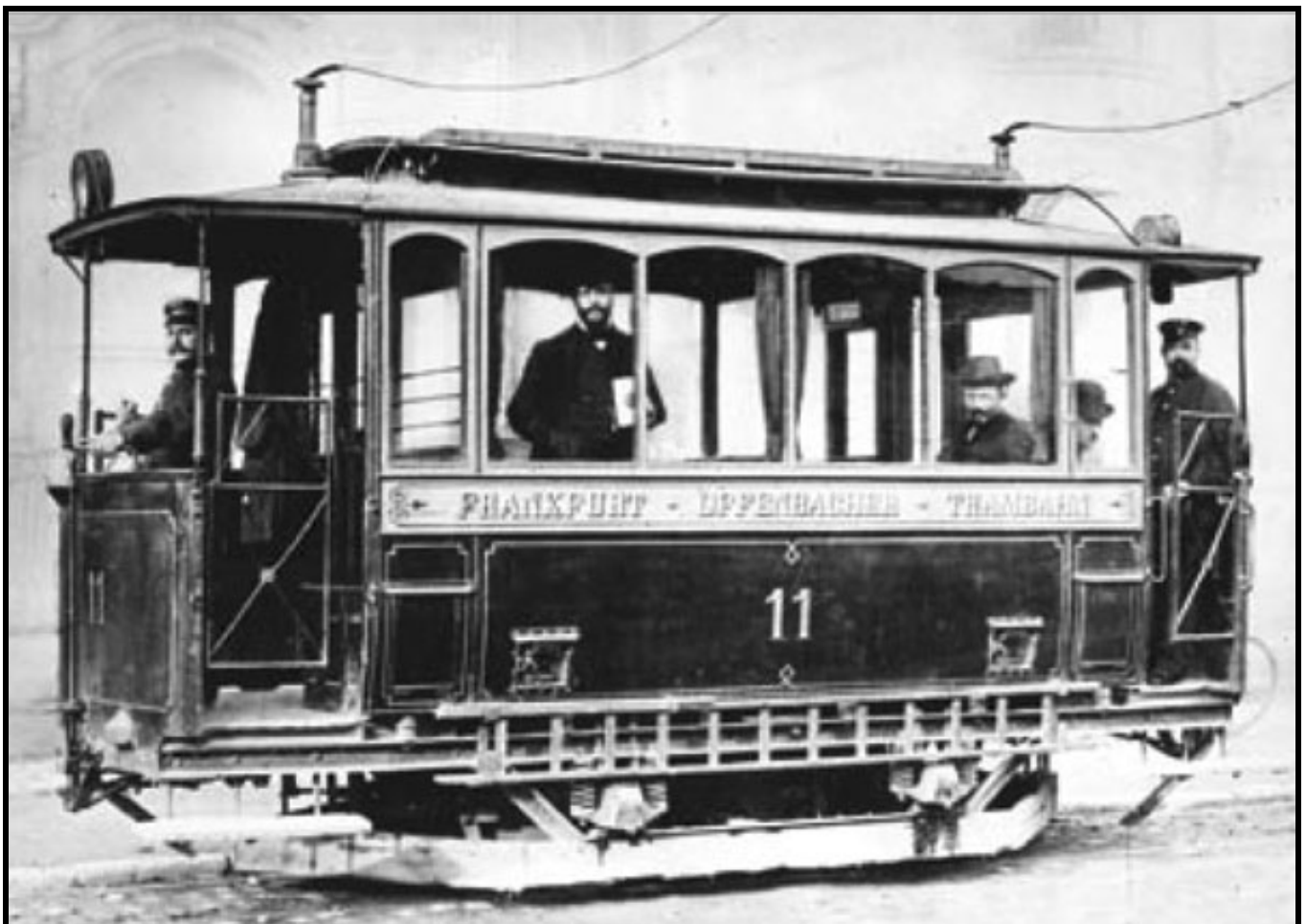
The Siemens Company went on to pioneer the use of electricity for trams, locomotives and in central generating stations.



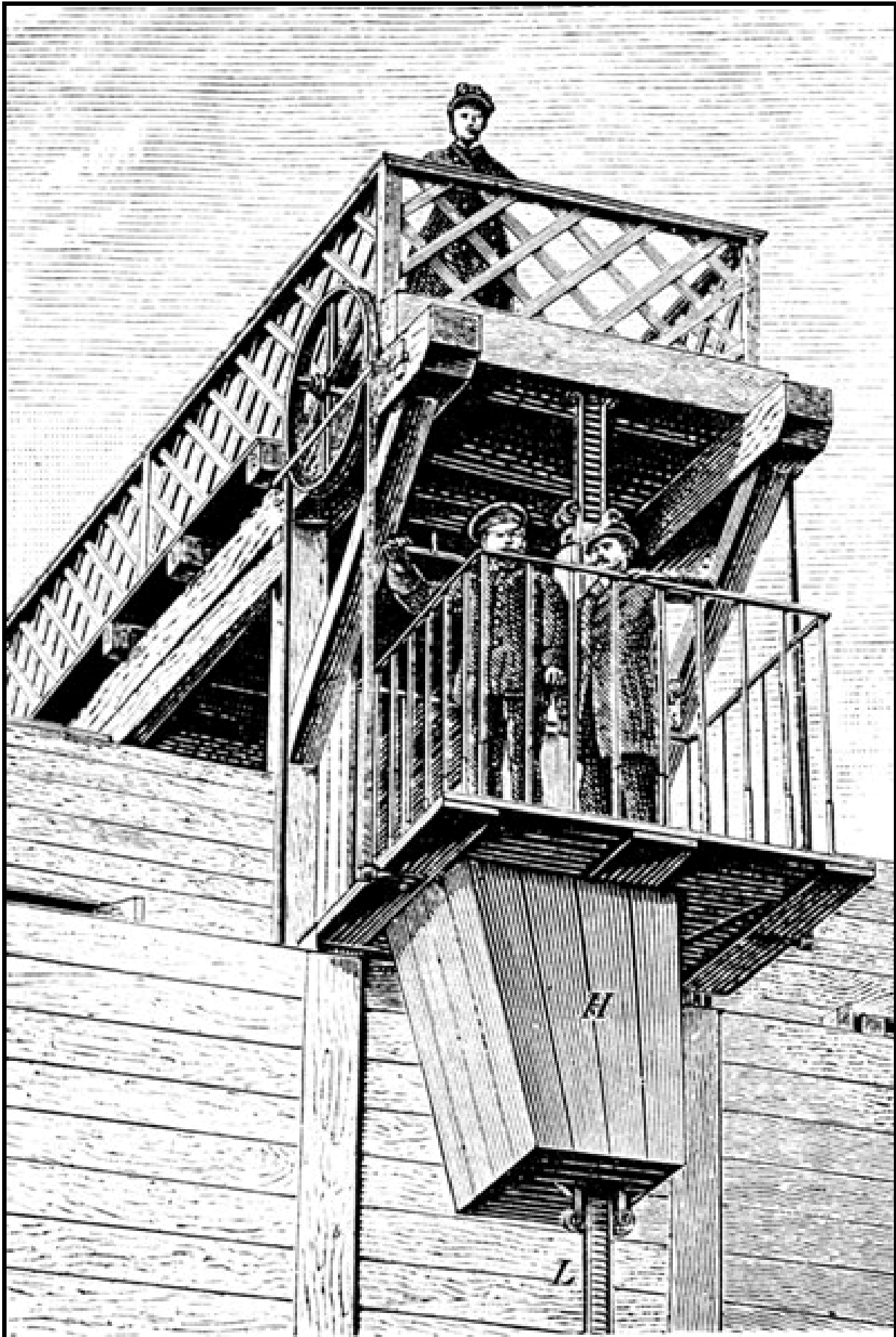
*Werner von Siemens, the first electric train in 1879
Driven by a 2.2 kW motor from a 150 volt DC supply*



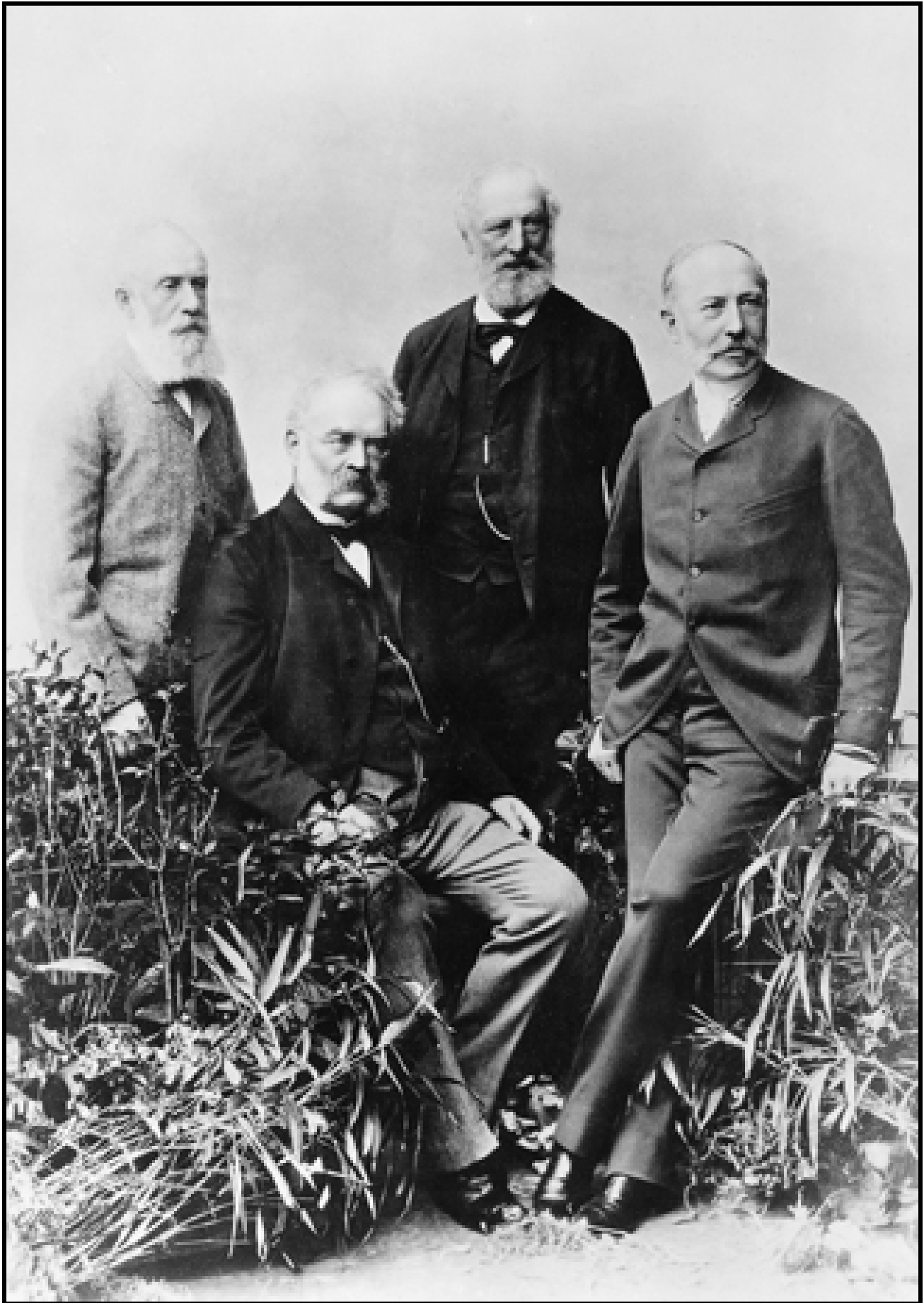
Siemens electric tram, 1882



Siemens electric tram in Frankfurt, 1884



Werner von Siemens has been credited with inventing the first electric elevator in 1880 (a rack-climbing type)



*The Siemens brothers
(Left to right): Werner, Carl, Ferdinand & Frederick, 1889*

Werner von Siemens retired in 1889. His Company continued and prospered.

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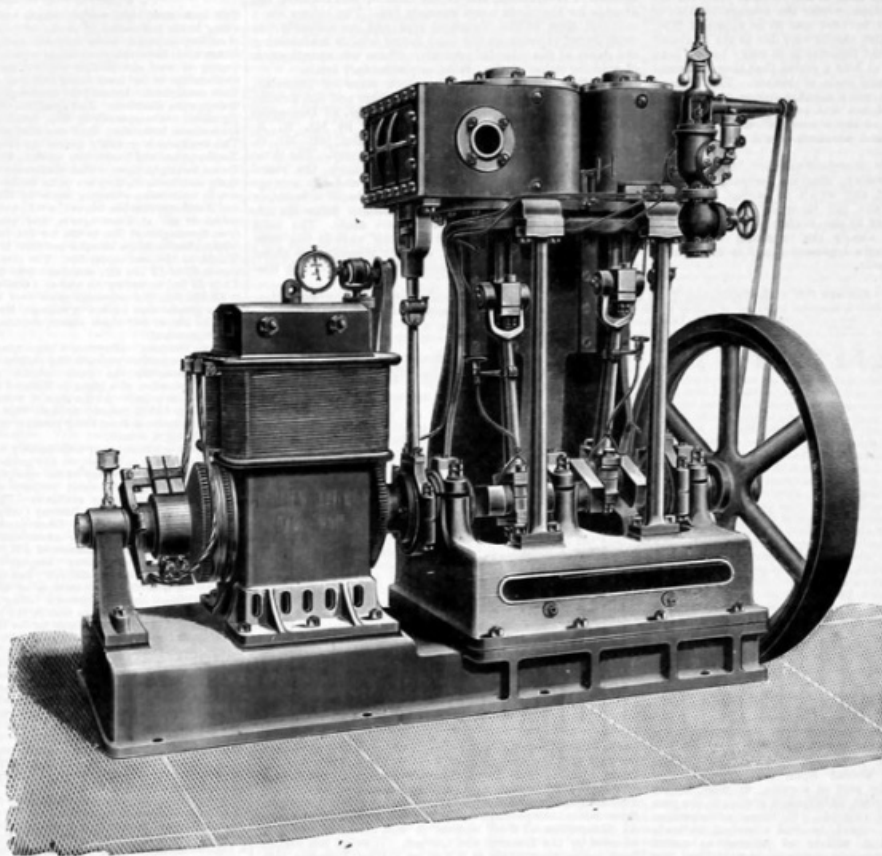
Branches in Newcastle-on-Tyne, Glasgow, and Melbourne.

Cables—"SIEMENS, LONDON."

Codes—"A.B.C., A.I. ENGINEERING."

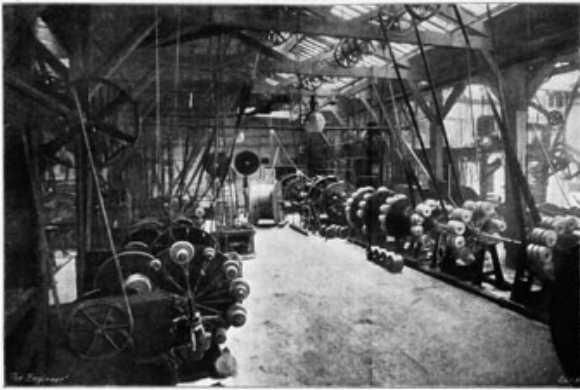
1898

ELECTRIC LIGHT ENGINES AND DYNAMOS, S.S. CALEDONIA
MESSRS. SIEMENS BROTHERS, AND MESSRS. TANGYER, ENGINEERS

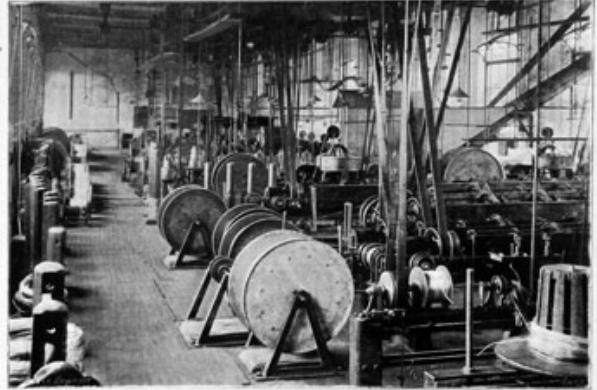


1895

THE ENGINEERING CONFERENCE—WORKS OF SIEMENS BROTHERS, LIMITED



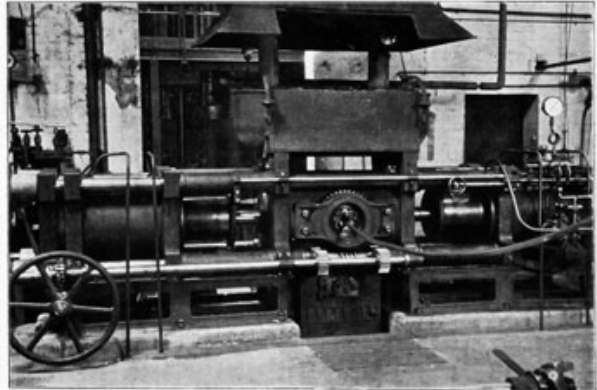
CABLE SHOP



STRANDING SHOP



TANK FOR TESTING GUTTA PERCHA CORES HYDRAULICALL.

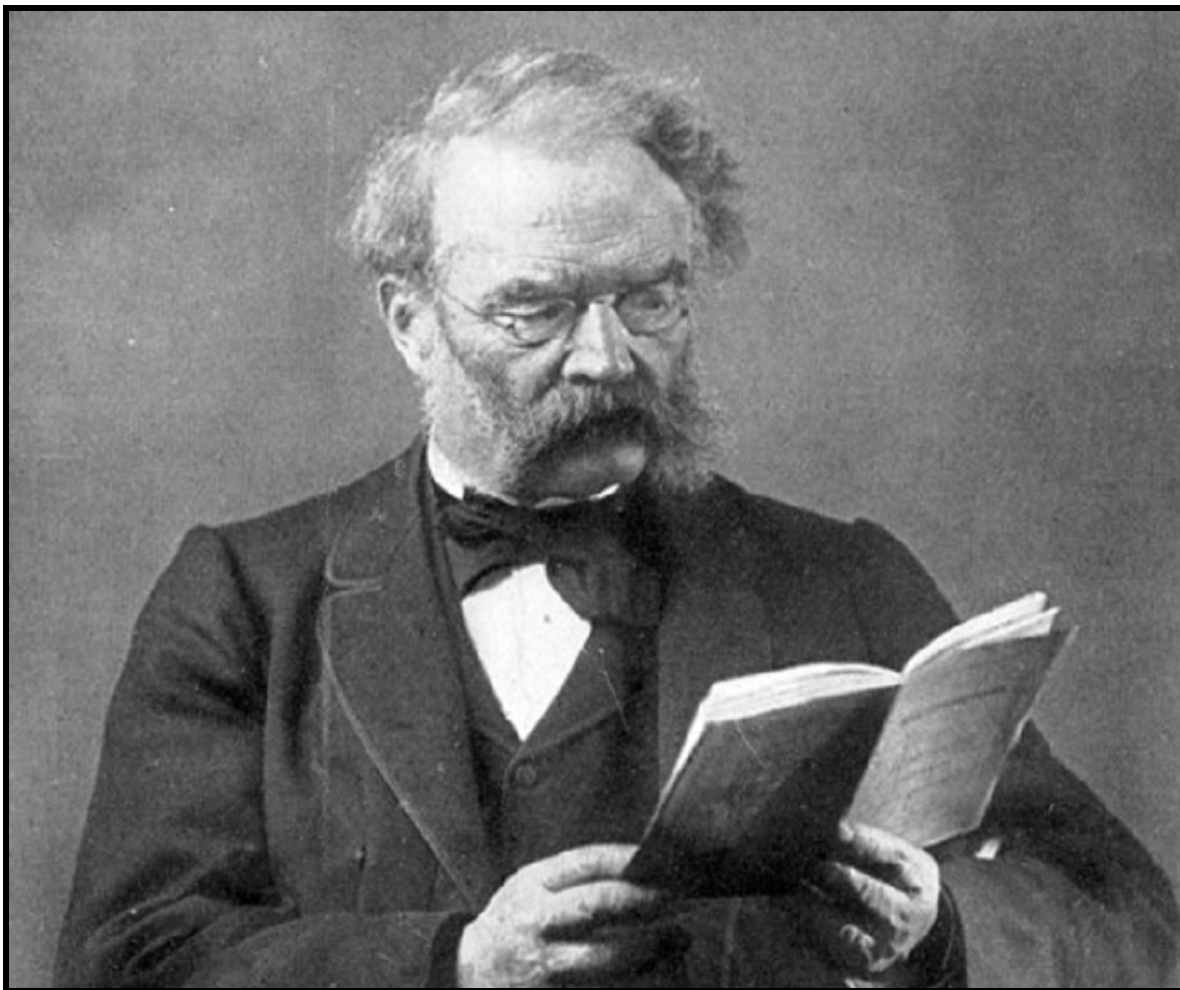


PRESS FOR MAKING LEAD-COVERED CABLES

1899



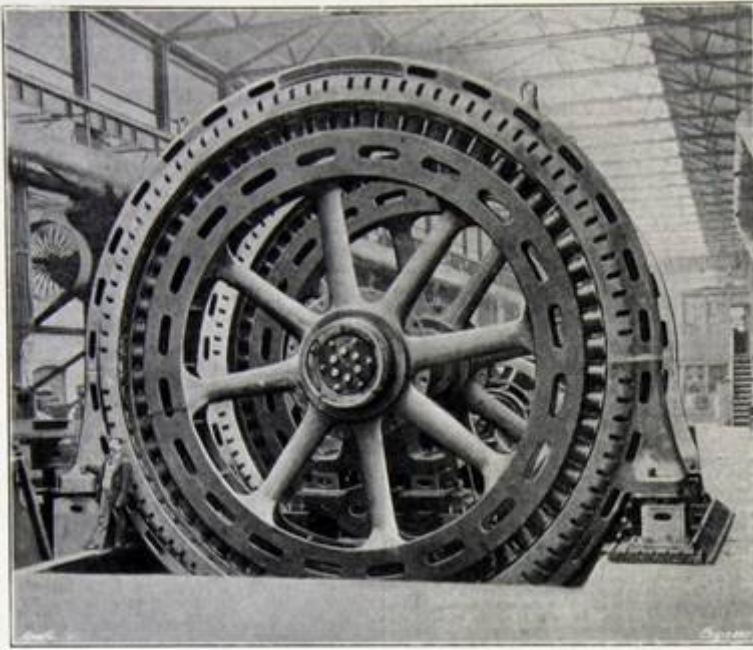
Siemens Berlin Factory, 1900



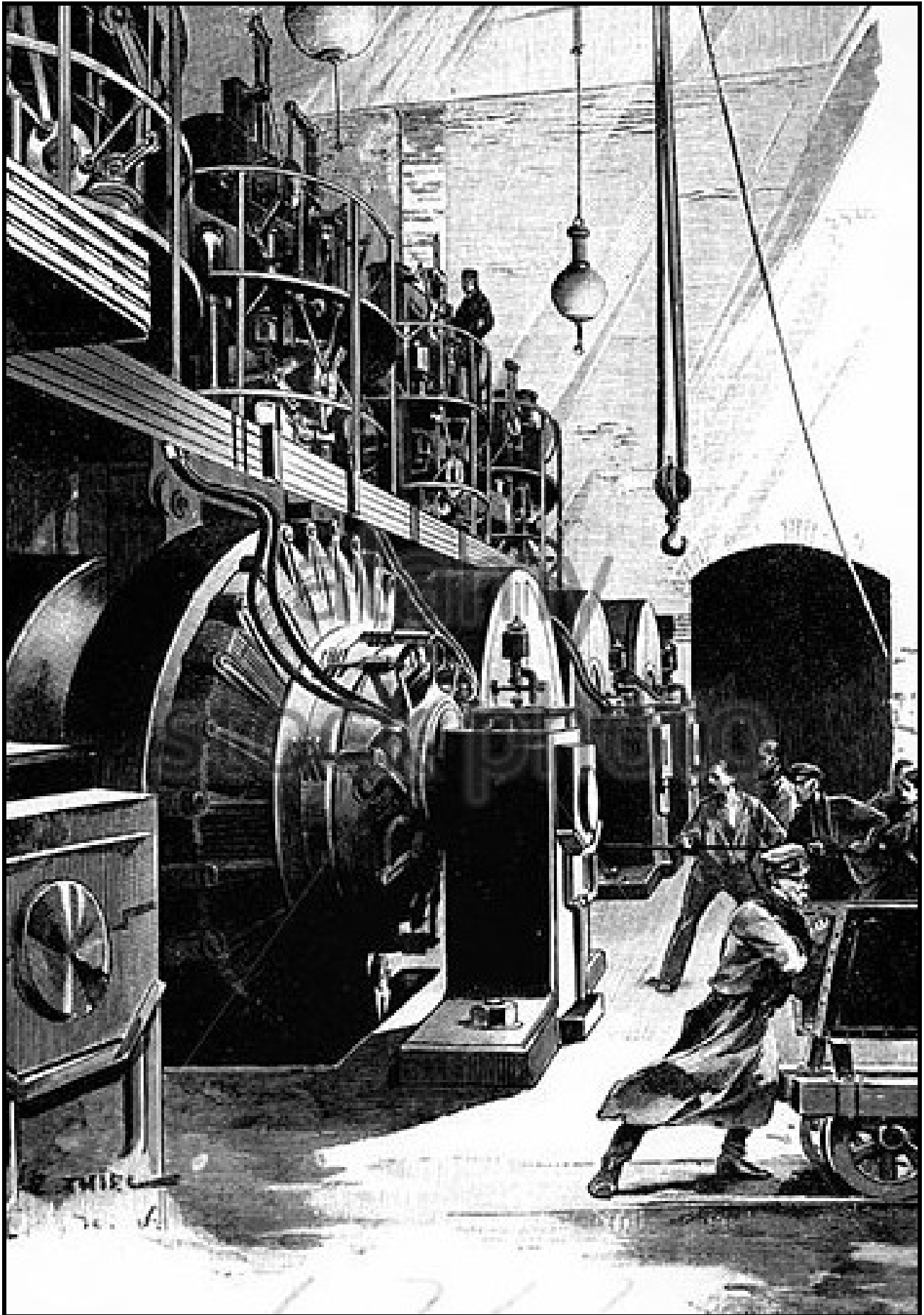
Ernst Werner von Siemens, 1816-1892

TWO-PHASE ALTERNATORS FOR JOHANNESBURG

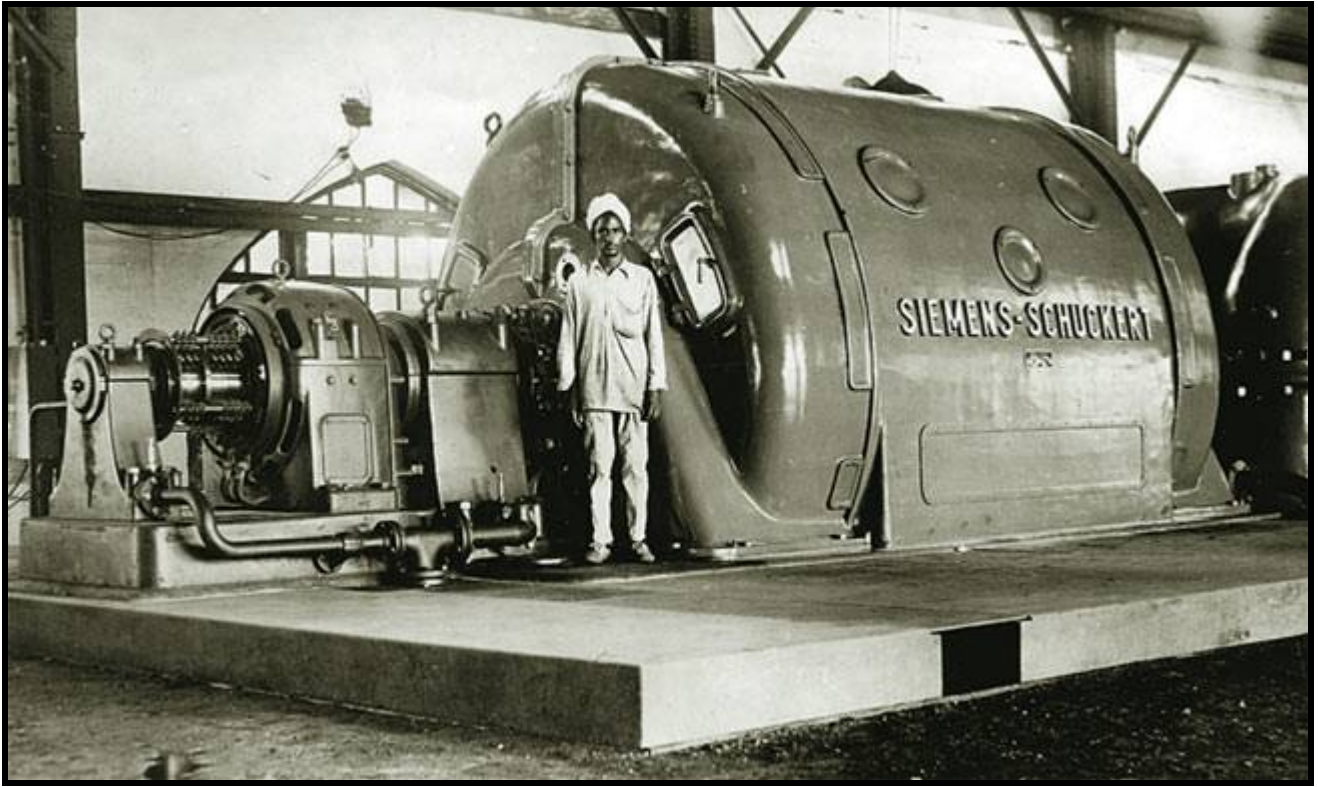
MESSRS. SIEMENS BROS. AND CO., LTD. LONDON, ENGINEERS



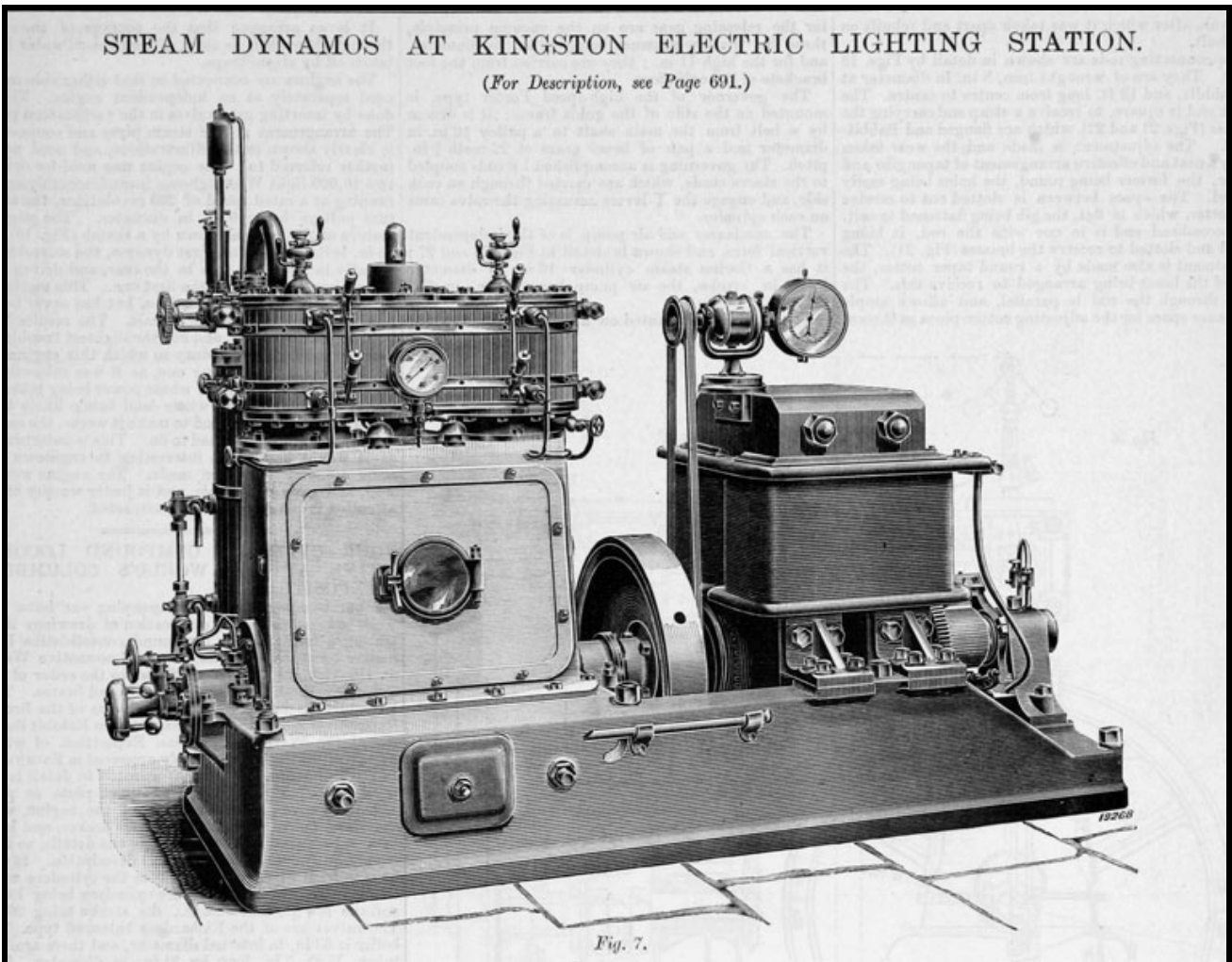
*William Siemens (seated) with his wife Anne and related family
Standing (left to right) Walter, Carl, Werner and Otto*



Siemens dynamo



Siemens in India, 1910



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APPENDIX: EXAMPLES OF SIEMENS AMERICAN PATENTS

(No Model.)

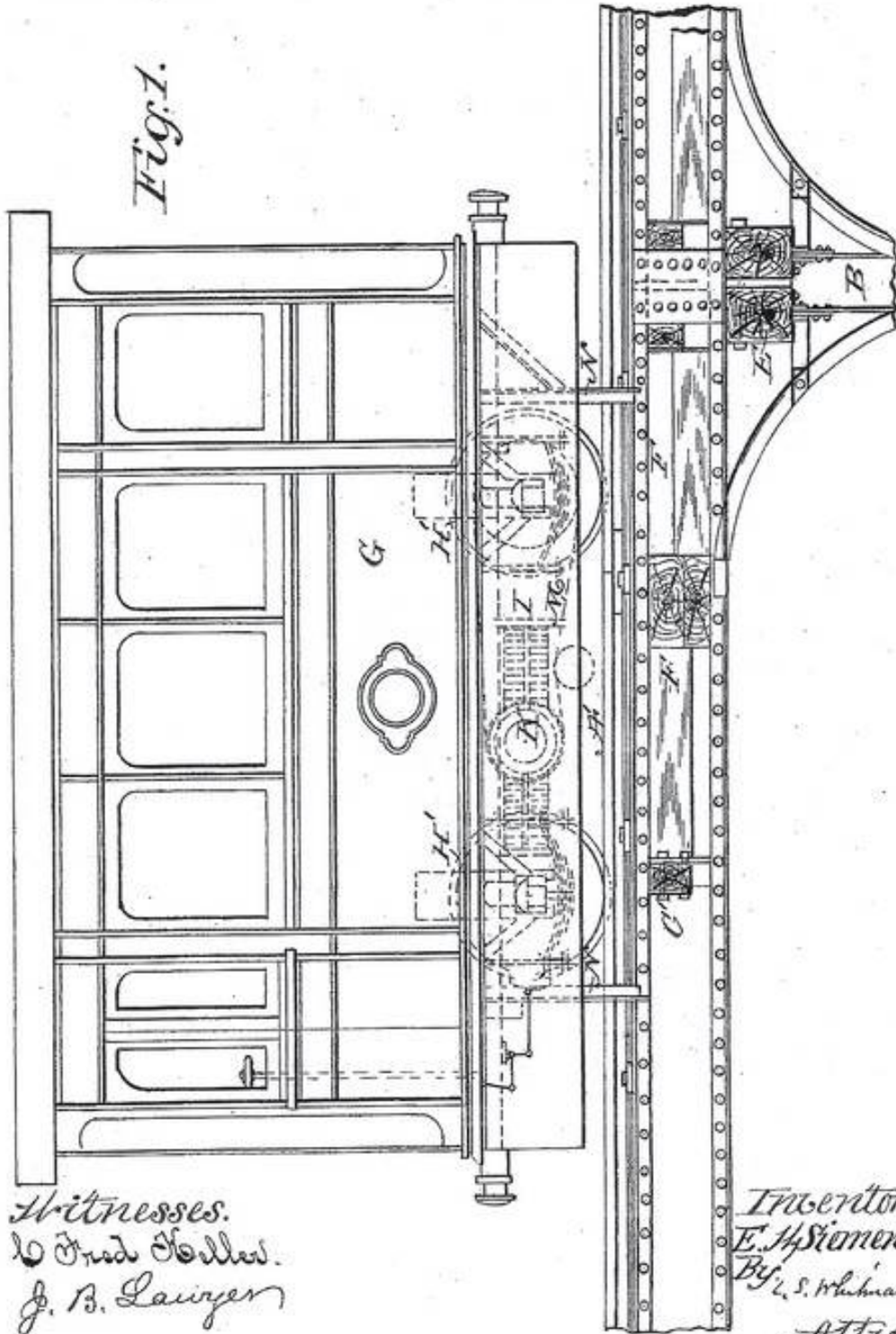
4 Sheets—Sheet 1.

E. W. SIEMENS.
ELECTRIC RAILWAY.

No. 340,462.

Patented Apr. 20, 1886.

Fig. 1.



Witnesses:
W. Fred Keller.
J. B. Lawyer

Inventor:
E. W. Siemens
By L. S. Whisman
Attys.

(No Model.)

4 Sheets—Sheet 2.

E. W. SIEMENS.
ELECTRIC RAILWAY.

No. 340,462.

Patented Apr. 20, 1886.

Fig. 2.

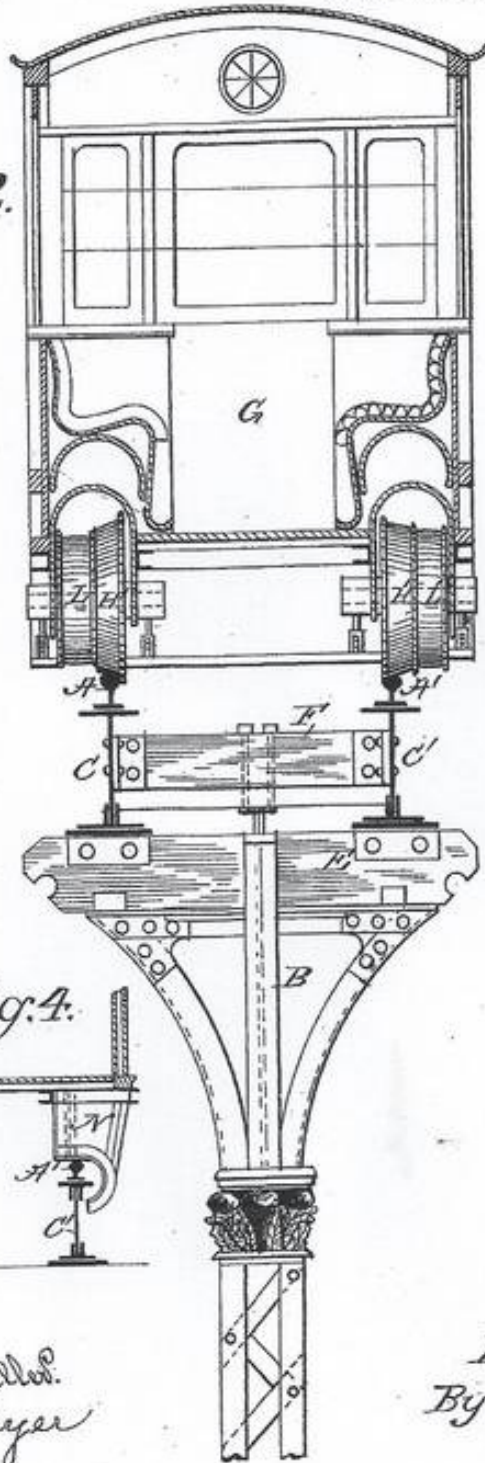
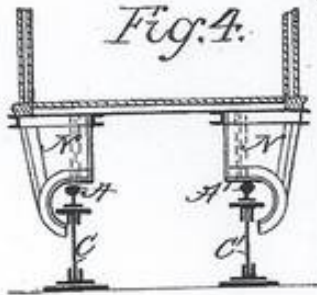


Fig. 4.



Witnesses:
G. Fred. Keller.
J. B. Langer

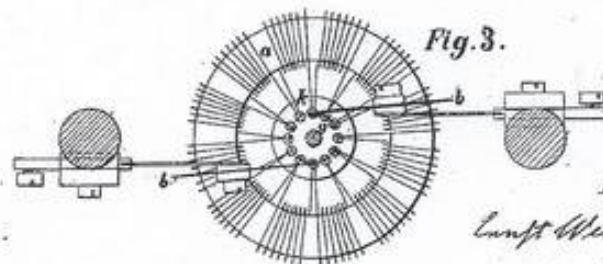
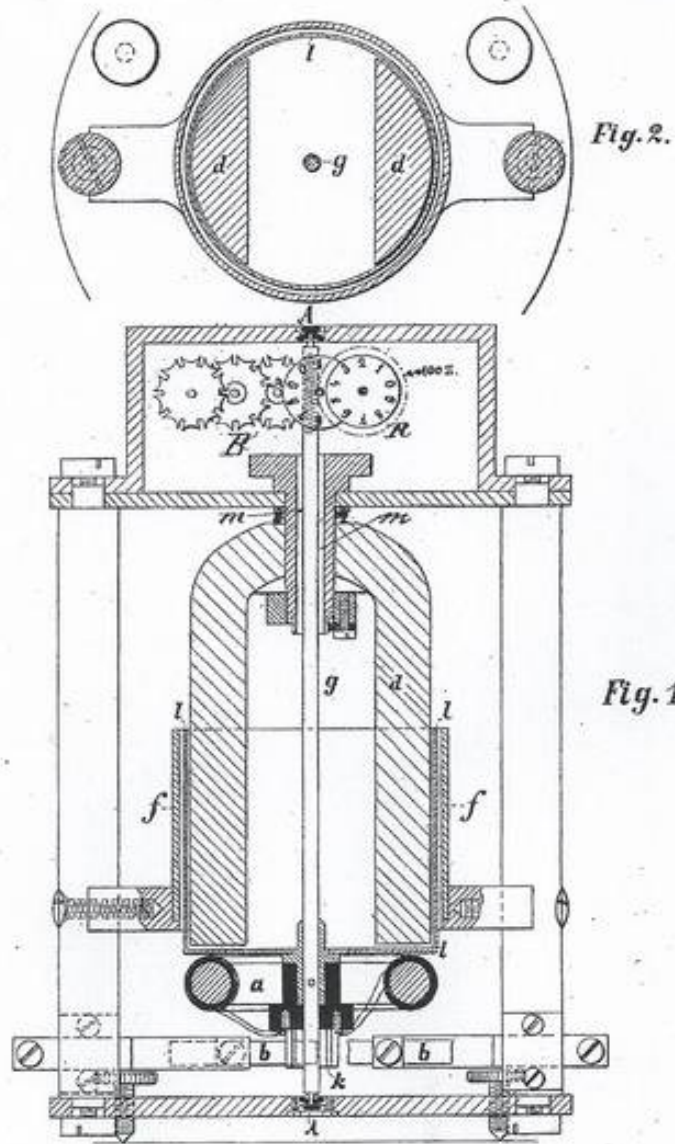
Inventor:
E. W. Siemens.
By C. S. Whelan
Atty.

(No Model.)

E. W. SIEMENS.
ELECTRIC METER.

No. 415,577.

Patented Nov. 19, 1889.



Witnesses:
Arthur Marks.

Inventor:
Carl Werner Siemens

(No Model.)

2 Sheets—Sheet 1.

E. W. VON SIEMENS.
ELECTRIC METER.

No. 428,290.

Patented May 20, 1890.

Fig. 1

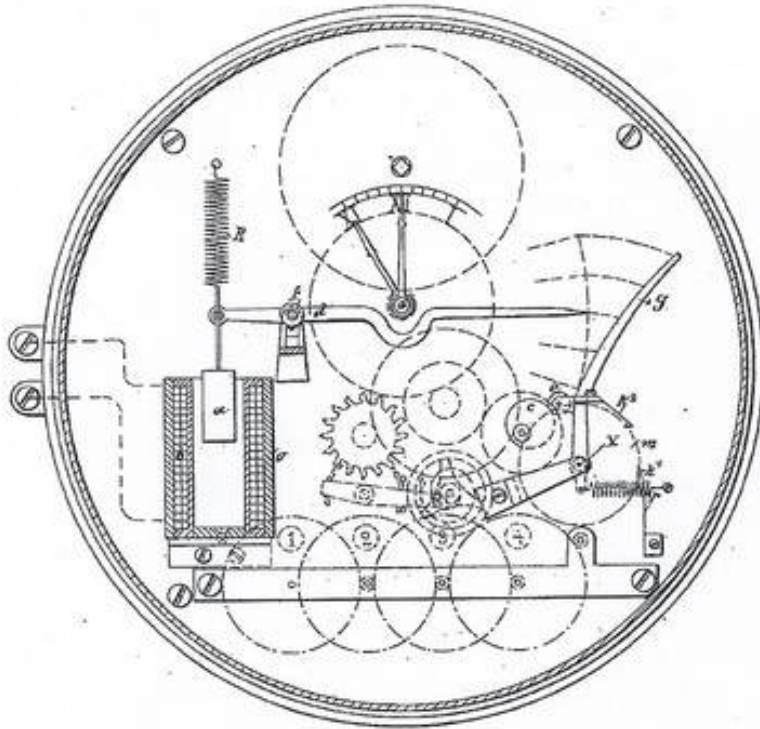


Fig. 2

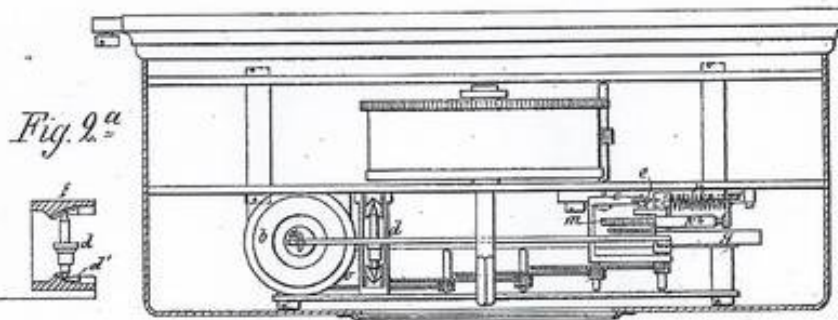


Fig. 2^a

Fig. 3.

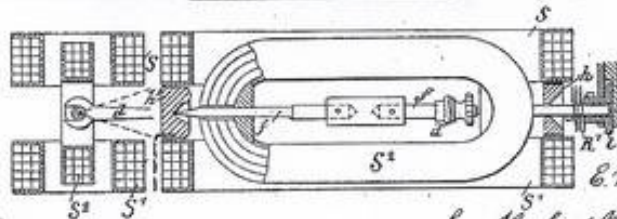


Fig. 4.

Witnesses:
W. Allen
A. S. Knight,

Inventor,
E. W. von Siemens.
by Herbert W. Jenner,
Attorney.

(No Model.)

2 Sheets—Sheet 1.

E. W. v. SIEMENS.
ELECTRIC RAILWAY.

No. 520,274.

Patented May 22, 1894.

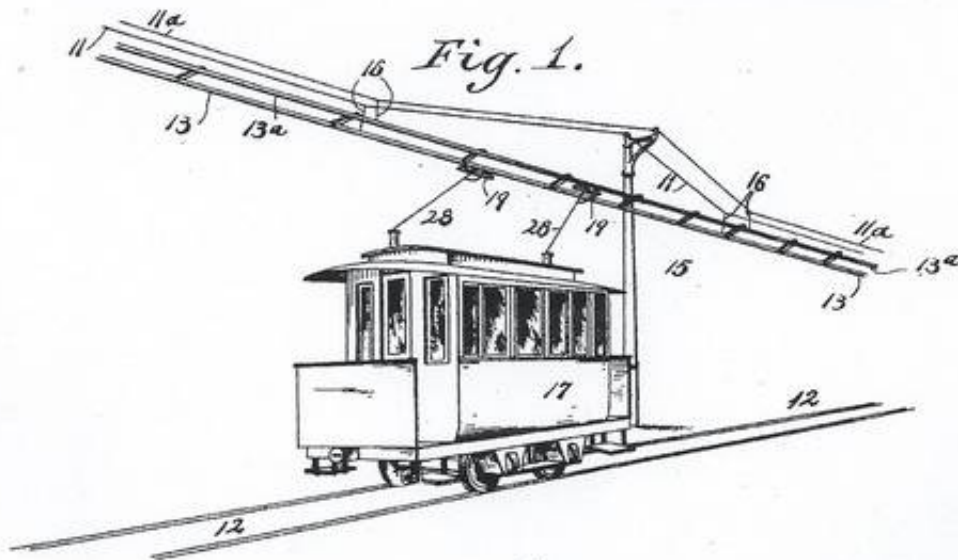


Fig. 2.

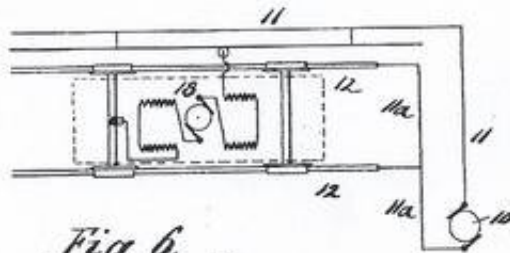


Fig. 6.

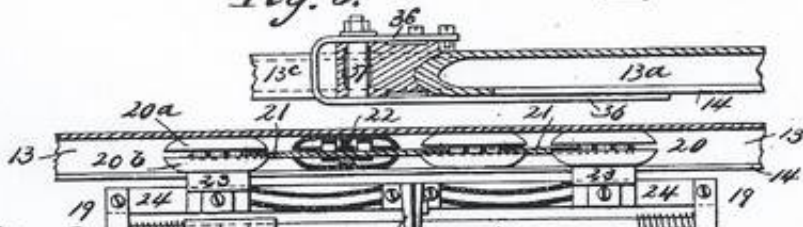
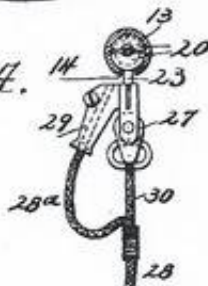


Fig. 3.



Fig. 4.



WITNESSES:
John H. Deemer
Alvin K. Goodwin

INVENTOR
 Ernst Werner von Siemens

BY
Geo. H. Frey
 ATTORNEY

(No Model.)

2 Sheets—Sheet 2.

E. W. v. SIEMENS.
ELECTRIC RAILWAY.

No. 520,274.

Patented May 22, 1894.

Fig. 5.

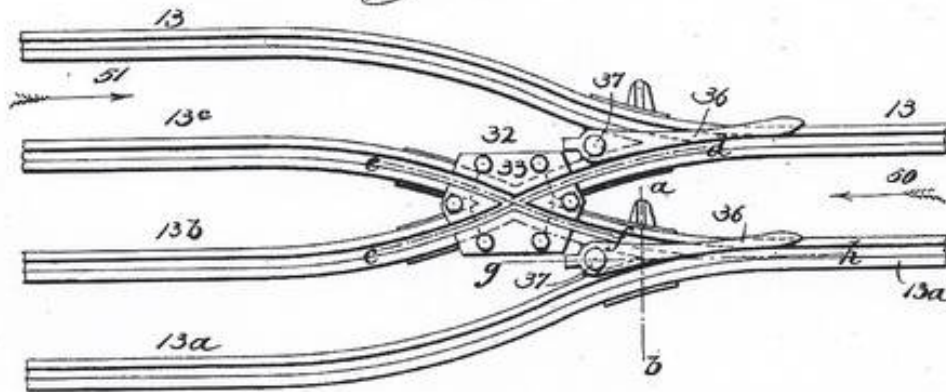


Fig. 8.

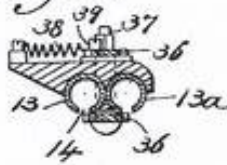


Fig. 7.

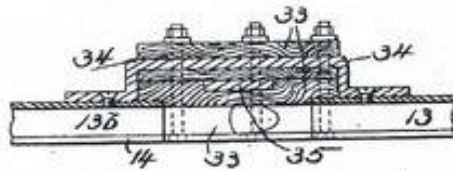


Fig. 9.

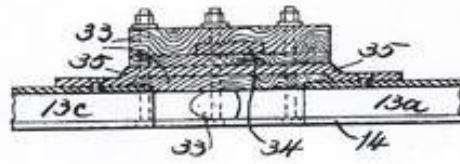
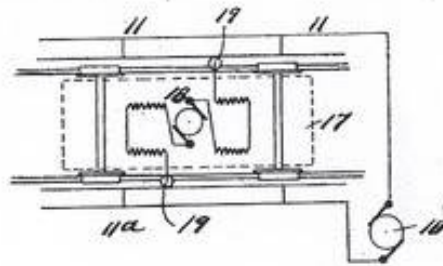


Fig. 10.



WITNESSES:

Johann Deemer
Alvin K. Goodwin

INVENTOR

Ernst Werner von Siemens

BY

Carl H. Seeger
ATTORNEY

BIBLIOGRAPHY

1958 *Siemens Brothers 1858-1958: An Essay in the History of Industry*: J D Scott, Weidenfeld & Nicolson, London

----- *E W Siemens*, US Patent Office Records

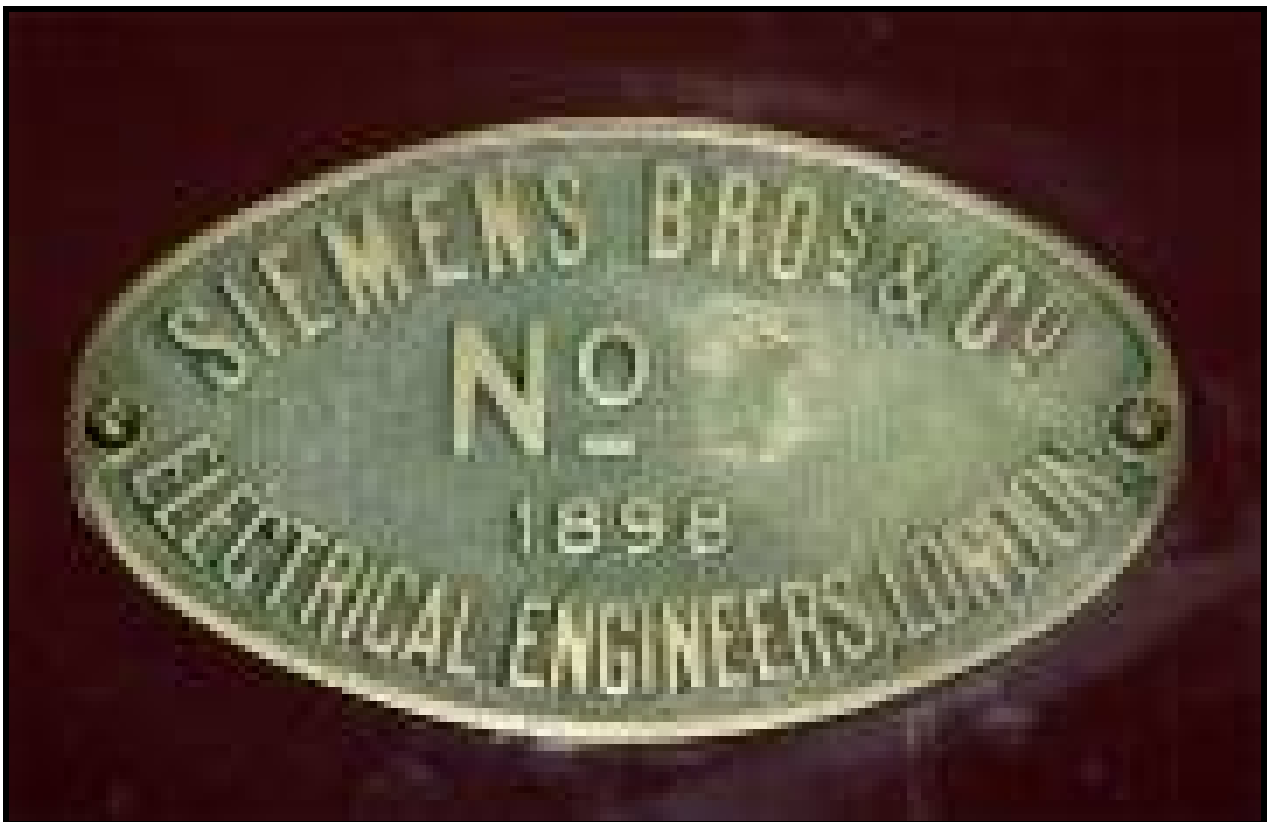
<http://www.britannica.com/biography/Werner-von-Siemens>

<https://en.wikipedia.org/wiki/Werner-von-Siemens>

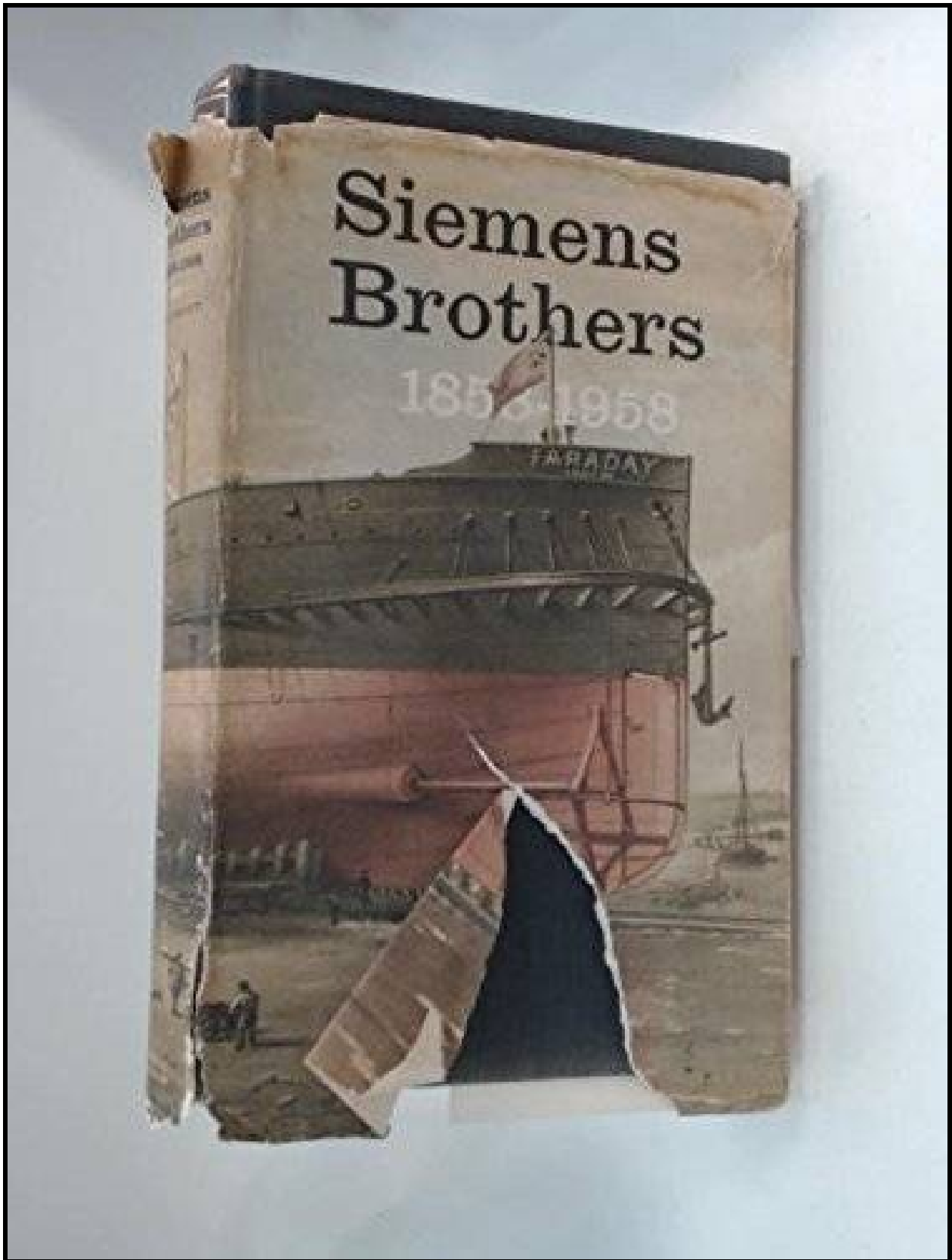
<https://www.siemens.com/history/en.personalities/founder-generation.htm>

<http://www.encllopedia.com/topic/Ernst-Werner-von-Siemens.aspx>


<http://www.gracesguide.co.uk/Siemens-Brothers-and-Co>



FURTHER READING



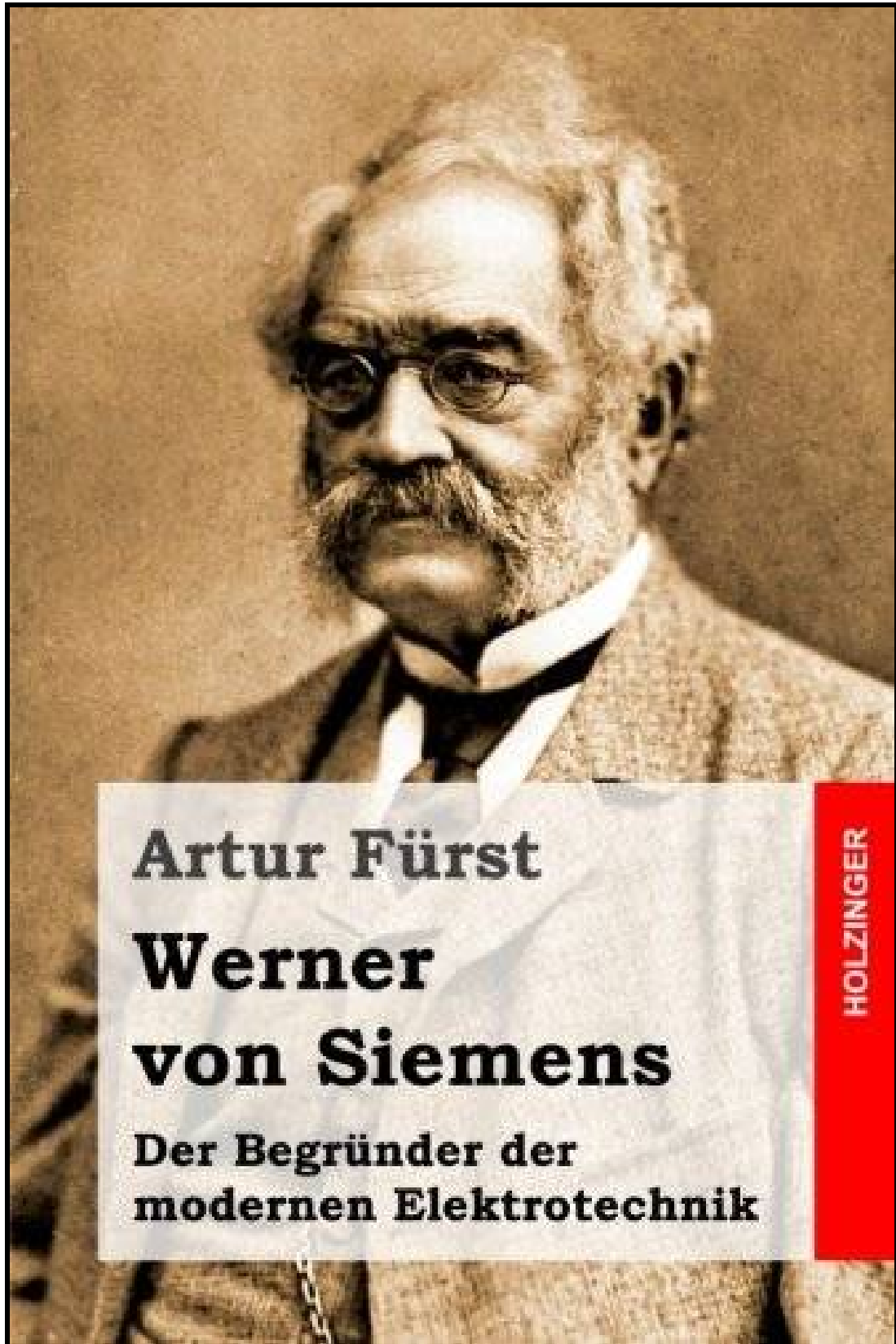
1958



Inventor and
entrepreneur:
Recollections of
Werner von Siemens

Siemens, Werner von

Note: This is not the actual book cover



Artur Fürst

**Werner
von Siemens**

**Der Begründer der
modernen Elektrotechnik**

HOLZINGER

EPILOGUE



Ernst Werner von Siemens died on the 6th December, 1892 in Berlin-Charlottenburg. He had received an honorary doctorate from the University of Berlin in 1860, had been a member of the Berlin Academy of Sciences since 1873 and was ennobled in 1888.

He was described as “a responsible entrepreneur and far-sighted inventor, (who) lent significant impetus to the still young-field of electrical engineering in the second half of the nineteenth century, and played a key role in fostering the development of the electrical industry.”

The SI derived unit, siemens (symbol S) for electric conductance is named after him.



The Werner von Siemens Grave & Memorial in Berlin