ELECTRICAL INSTALLATIONS OF ELECTRIC LIGHT, POWER, TRACTION AND INDUSTRIAL ELECTRICAL MACHINERY. IN FOUR VOLS. VOL. I. - THE ELECTRICAL CIRCUIT, MEASUREMENT, ELEMENTS OF MOTORS, DYNAMOS, ELECTROLYSIS

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RANKIN KENNEDY

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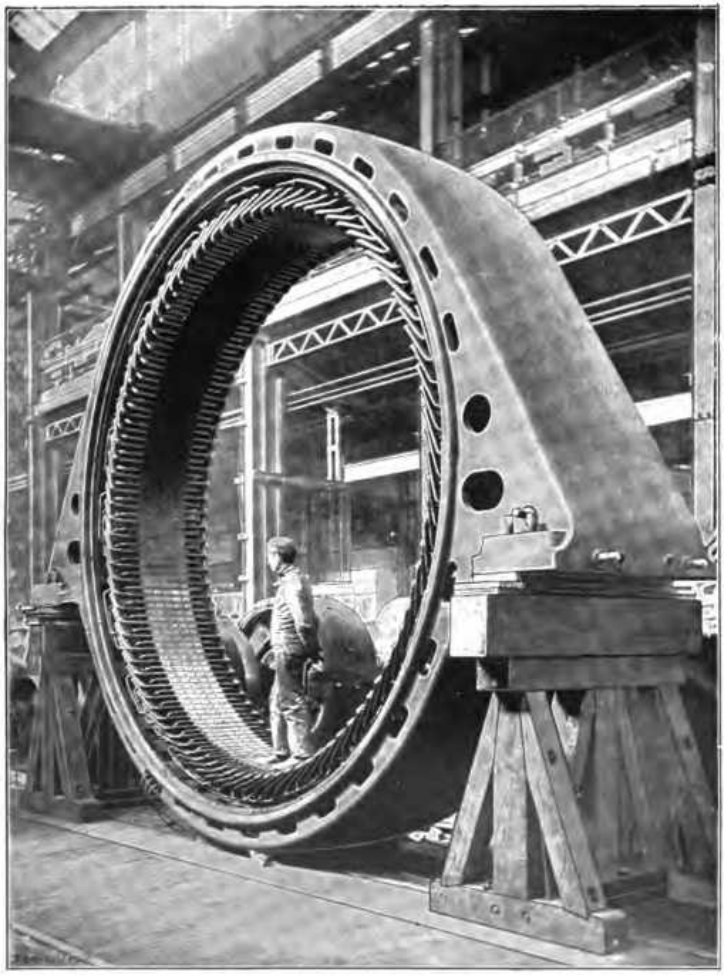
ELECTRICAL INSTALLATIONS



ARMATURE OF A TWO-PHASE ALTERNATING FLYWHEEL GENERATOR. WESTINGHOUSE

ELECTRICAL INSTALLATIONS

OF

ELECTRIC LIGHT, POWER, TRACTION AND INDUSTRIAL ELECTRICAL MACHINERY

BY

RANKIN KENNEDY, C.E.

AUTHOR OF "ELECTRICAL DISTRIBUTION BY ALTERNATING CURRENTS," "PHOTOGRAPHIC AND OPTICAL ELECTRIC LAMPS," AND NUMEROUS SCIENTIFIC ARTICLES AND PAPERS

IN FOUR VOLS.

WITH NUMEROUS DIAGRAMS AND ILLUSTRATIONS

VOL. I.—THE ELECTRICAL CIRCUIT, MEASUREMENT, ELEMENTS OF MOTORS, DYNAMOS, ELECTROLYSIS

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PREFACE TO VOL. I

THE main object of this book is to describe in detail, first, the scientific principles underlying the practice in electrical engineering, and secondly, the actual practice in the various branches of electrical engineering. The first volume is necessarily elementary and general in treatment. No attempt has been made to dip into the abstract sciences of electricity and magnetism further than to reach results and principles actually practised. For instance, it is not necessary for a practical man engaged in engineering to work out curves of permeability for iron; it is sufficient for him to have a table of exciting power required per inch length of iron to be magnetised to any degree within which he works. It is more important for the practical man to know how to apply the facts and figures obtained by the pure scientist than to know how they are obtained. Hence, this first volume refers to the methods for using ascertained figures, or values, without any pretence at explaining how such values have been arrived at. Similarly, it is not necessary for the practical engineer to treat magnets as the scientific magnetician does. He has only to deal with ampere-turns and reluctance and the resulting magnetic flux in a magnetic circuit. At the same time the student should as far as possible study the more abstract and purely scientific basis of the division of the subject upon which he may wish to become a specialist.

It seemed to the author better to direct attention to the facts, figures, values, and special devices of practical importance, assuming only an elementary knowledge of magnetism and electricity and arithmetic on the part of the reader; and to recommend experiments as an aid to understanding the common units of measurement and their value, also the use of ammeters and voltmeters, not as mere indicators on a switchboard, but as instruments of research whereby one can examine an electrical installation or circuit by Ohm's laws. The study of static electricity is only of value from the dielectric point of view, and has so been treated.

Electrolysis is becoming of great importance, and is the one division of electrical engineering which has from Faraday's time down to this day been treated in a thoroughly practical manner. In this volume only the leading principles have been referred to, recom-

Preface

mending experiments again in every case, with exact measurement by ammeter and voltmeter.

Practical engineers had to find out the principles of the magnetic circuit. Twenty-five years ago the designing of magnets was mere guesswork, or left to the "designing eye." I have not entered into this part of the subject from the "free magnetism" and "single magnetic pole" point of view, but only from the "magnetic circuit" theory; for in practice the engineer has rarely to study a magnetic problem from any other standpoint.

The scientific student should go back to the early principles and master the old science, more especially as the correlation of physical units cannot be understood without a knowledge of the early theories.

The succeeding volumes of this work deal in detail with actual practice in the great divisions of the subject.

The English system of magnetic units has been used, but in the full treatment of dynamos and motors both that and C.G.S. unit system shall be illustrated.

Thanks are due to the manufacturers of the various appliances illustrated, for assistance with blocks and information kindly supplied.

RANKIN KENNEDY.

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