

**DIRECT-CURRENT MOTOR
AND
GENERATOR TROUBLES:
OPERATION AND REPAIR**

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Direct-Current Motor and Generator Troubles: Operation and Repair by Theodore S. Gandy & Elmer C. Schacht

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THEODORE S. GANDY & ELMER C. SCHACHT

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**DIRECT-CURRENT
MOTOR AND GENERATOR TROUBLES
OPERATION AND REPAIR**

BY

THEODORE S. GANDY

DESIGNING ELECTRICAL ENGINEER OF DIRECT CURRENT
MACHINERY, GENERAL ELECTRIC COMPANY, SINCE 1904

AND

ELMER C. SCHACHT, LT. J. G., U. S. N. R. F.

IN CHARGE OF ELECTRICAL INSTRUCTION AT THE UNITED STATES
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PREFACE

The chief purpose of this book is to give the methods, which many years of experience have proved to be both simple and effective, for tracing and remedying direct current motor and generator troubles. In addition, the questions of the selection, operation, care and repair of direct current machinery are analyzed from the standpoint of the operator.

The theories of why a motor or generator will run, as well as the problems and fundamentals underlying the design of direct current machinery, have been very completely given and expounded in numerous excellent books on the market. But it is our belief that there is a vast army of operators in the electrical world who are greatly interested in why the motor or generator will not run, and it is to supply information on this topic that the present work has been written. Throughout, it is assumed that the operator is confronted with the question of selection of the best machine for his purpose; then with the question of the best operation of that machine and in case of troubles, with their tracing and effective remedying.

In all cases, an effort has been made to treat the subjects in as general a way as possible so as to include all methods in good practice. Standard machines are described and illustrated so as to in no way limit and restrict the information to the operation of special types. We are greatly indebted to the General Electric Company, the Westinghouse Electric Manufacturing Company, and the Allis-Chalmers Company for their kindness in furnishing the illustrations for this publication.

THE AUTHORS.

SCHENECTADY, N. Y.,
April, 1920.

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INTRODUCTION

There are many books on matters electrical, some people believe, more than necessary or desirable. There are books on the theory of electrical engineering, on the theory of electrical apparatus, of electric systems and methods of operation. They are necessary, for on the theory of electrical engineering rests our giant electrical industry, which could not have developed without it. It was this thorough theoretical foundation which has enabled electrical engineering, though the last of the great engineering branches, to progress with the wonderful rapidity which outstripped all others. There are numerous books on apparatus and machinery design. While perhaps not one out of ten electrical engineers may become a designer, they are necessary and useful. There are numerous books on practical electrical engineering, good, bad and indifferent.

But for every designer or theorist, there are two or three electrical engineers who have to do with electric motors or generators, their operation, management and care, and therefore Messrs. Gandy & Schacht's book appears to me as extremely useful, filling a serious gap in our electrical literature. I may call it a biology, pathology and therapy of the electric machine.

It deals with the electric machine in all its conditions, in health and when in trouble. It gives the characteristics, describes the construction and the nature of the electric motor and generator, shows and illustrates the numerous troubles which may occur in motors and generators—almost as many as there are diseases of mankind—teaches how to diagnose the trouble, that is, to find out what is the matter, how to cure it, to remedy the trouble, and how to keep the machine in good shape, that is, in first class operating condition.