

# **TRANSMISSION OF POWER BY WIRE ROPES**

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Transmission of Power by Wire Ropes by Albert W. Stahl

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**ALBERT W. STAHL**

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BY

# WIRE ROPES.

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**ALBERT W. STAHL, M. E.**

CADET-ENGINEER U. S. N.



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## PREFACE.

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It has been my object, in the preparation of this work, to make it a complete exposition of the theory and practice of transmitting power by wire ropes.

No complete treatise on this subject has yet been published in the English language, although the practical part of the matter is well explained by the U. S. Commissioners in their report on the Paris Exposition of 1867, and by an excellent pamphlet written by W. A. Roebling, C. E., to which I am indebted for much practical information.

In Europe, this method of transmitting power has found many ardent supporters. Among them, I may mention Prof. F. Reuleaux of Berlin, who has devoted a number of chapters to it in his various scientific publications, and Messrs. J. J.

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Rieter & Co. of Winterthur, Switzerland. The latter gentlemen have erected by far the greatest number of transmissions there; and their engineer, Mr. D. H. Ziegler, has written quite extensively on the matter.

In this country the John A. Roebling's Sons Co. are the largest manufacturers.

It is to the publications above mentioned, that much of the matter in the following pages is due.



# TRANSMISSION OF POWER BY WIRE ROPES.

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## SECTION I.

### INTRODUCTION.

It is a noteworthy historical fact, that economy in the generation of power in the motor, and economy in its utilization in the machine, have, in most countries, been far in advance of its economical transmission from the one to the other.

Ever since the steam engine became an established fact in the hands of Watt, inventors have been engaged in making improvements to render it still more efficient. The immense strides taken in advance may be well appreciated by even the most casual comparison of the engine of Watt's time, with one of the

powerful and economical engines of the present day.

Not only have such ideas, as the expansion of steam, been developed to a remarkable extent, but even in the smallest details the watchful eye of the mechanic has ever been finding room for improvement.

In the course of invention, the principles upon which the steam engine has been made a practical success have been developed; and during the present century, the chief application of inventive genius has been turned in the direction of improvement in the combination of the parts of the engine itself. There has been no fundamental change in the conception of the necessary parts of the steam engine; but various modifications of the mechanism have been introduced, whereby the power has been economized, or the necessary friction of the parts has been lessened. Influenced by the same spirit which has characterized the scientific advance of this century; by the increasing necessity of more accurate

methods; and forced by the industrial competition of the age to consider the importance of economy of time and energy, the improvers of the steam engine have seen that their inventions would be recognized as valuable, only as they attained the same results with increased simplicity of action, with less waste of power in the working of the mechanism, or with a less supply of fuel.

As the Englishman, Watt, in the last century, found the steam engine an imperfect and wasteful arrangement for utilizing only a small portion of the energy of the steam supplied to it, and by his invention of a separate condenser, and then by his method of making the engine double-acting, made it really a steam engine; so in this century the credit is largely due to Americans, such as Allen, Corliss and others, for improvements by which, in the engines known under their respective names, simplicity of construction, together with perfection of economy in working, have been secured.