

**MACHINE DESIGN.
PART I: KINEMATICS
OF MACHINERY**

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Machine Design. Part I: Kinematics of Machinery by Forrest R. Jones

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FORREST R. JONES

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PART I.

KINEMATICS OF MACHINERY.

BY

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PREFACE.

In these notes an attempt is made, first, to give, as clearly and concisely as possible, the principles of mechanical motion in such a manner that their application can readily be made to any mechanism for determining the motion of any of its parts; then to show the methods of dealing with such problems as the designer meets daily. Long and tedious discussions have been avoided as far as possible, it is hoped, fully.

Subjects such as toothed gearing and couplings are taken up only to the extent of the forms that are in the most common use. But with these subjects, as well as all others, references to what are believed to be the best works in their lines are given frequently.

All available works on the subject have been freely consulted, but in no case has any matter which has not become common property by its frequent publication been used without the consent of its author.

The exceedingly clear and concise work of Prof. Albert W. Smith, of Stanford University, entitled "Machine Design," has been of most valuable assistance throughout. This work includes both kinematics and mechanics. To Prof. Smith, especially, the writer would acknowledge his obligations and express his thanks.

FORREST R. JONES.

MADISON, Wis., November, 1897.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial statements. This includes not only sales and purchases but also expenses, income, and transfers between accounts.

The second part of the document provides a detailed breakdown of the accounting cycle. It outlines the ten steps involved in the process, from identifying the accounting entity to preparing financial statements. Each step is explained in detail, with examples provided to illustrate the concepts. The cycle is presented as a continuous loop that repeats every year.

The third part of the document focuses on the classification of accounts. It explains how to distinguish between assets, liabilities, and equity accounts, and how to further subdivide them into current and non-current categories. This classification is essential for preparing the balance sheet and the statement of financial position.

The fourth part of the document discusses the recording of transactions. It covers the process of analyzing a transaction, determining the accounts affected, and recording the entry in the journal. It also explains how to use T-accounts to visualize the debits and credits for each account.

The fifth part of the document addresses the posting process. It describes how to transfer the journal entries to the ledger accounts and how to calculate the ending balances for each account. This step is crucial for ensuring that the ledger is balanced and that the total debits equal the total credits.

The sixth part of the document discusses the preparation of financial statements. It explains how to use the ledger balances to prepare the income statement, the statement of financial position, and the statement of owner's equity. It also provides a checklist of items to verify before finalizing the statements.

The seventh part of the document covers the closing process. It describes how to close the temporary accounts (revenues, expenses, and dividends) to the permanent accounts (retained earnings) and how to prepare the closing journal entries. This process resets the temporary accounts for the next accounting period.

The eighth part of the document discusses the importance of adjusting entries. It explains how to identify and record adjusting entries for accrued revenues, accrued expenses, prepaid expenses, and unearned revenues. These adjustments are necessary to ensure that the financial statements reflect the true financial position of the company at the end of the period.

The ninth part of the document covers the preparation of the trial balance. It explains how to use the ledger balances to prepare a trial balance and how to identify and correct errors. The trial balance is a key tool for verifying the accuracy of the accounting records.

The tenth part of the document discusses the importance of maintaining accurate records. It emphasizes that every transaction should be recorded in a timely and accurate manner to ensure the reliability of the financial statements. It also provides tips for organizing the accounting records and for maintaining proper documentation.

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KINEMATICS OF MACHINERY.

CHAPTER I.

GENERAL PRINCIPLES AND DEFINITIONS.

MOTION OF A BODY.

1. When a body moves, there must always be another body with regard to which the motion occurs. Sometimes the statement that the movement takes place is all that is necessary to define it, the conditions being such that the reference body is clearly implied; but at other times a more specific statement is required. A simple example will illustrate: When a boat is running through the water at the rate of 12 miles an hour against a current of 3 miles an hour, the motion is clearly 12 miles an hour relatively to the water; but when referred to the land it is $12 - 3 = 9$ miles an hour.

The wheel of a locomotive furnishes another example: As the locomotive passes along the track, the wheel simply rotates with regard to the frame of the engine; but when referred to the track, the motion is a combined one of rotation and translation.

An examination of the motion of the piston shows a somewhat similar case: Relatively to the locomotive, the motion is reciprocating, its path being back and forth from end to end of the cylinder; but the motion is always forward with regard to the track when the locomotive moves forward, and *vice versa*.

A body entirely free to move may have motion in any direction according to the influences brought to bear upon it. In order for the motion to be a useful one, it must be constrained to such an extent that it will fulfil its required functions.