

# Introduction

## A. DAVIDSON

The construction of precision engineering products differs from the conventional engineering of machines, steel structures and so on, not only because it involves a particular design philosophy, as emerges very clearly in mass production projects, but also because of the problems it presents in job production and batch production processes. Tolerances, and the proper choice of material, are of the utmost importance.

The greater part of the present volume is devoted to descriptions of structural elements. Although essential information concerning permanent joints has already been given in Volume 5, all the possible forms are described here for the sake of completeness. Many of the detachable fastenings have been standardized. Information concerning them is to be found in Part 1, as well as in the present volume. Guides, bearings, etc., although mentioned in various other parts of the Handbook, are nevertheless discussed at some length. The same applies to gear wheels and gear trains. Other mechanical components, such as locking devices, springs, couplings, friction clutches and so on, are reviewed in detail. Diagrams are employed very extensively throughout the first chapter, because a pictorial survey explains matters more clearly than any description. The captions merely clarify the details.

Chapter 2 contains examples of practical applications in precision engineering. Since it is, of course, beyond the scope of this volume to include descriptions of all possible structures, the examples given are confined to two specific branches of precision engineering, namely cinematograph equipment and sewing machines, although it is shown that similar structures are employed in other kinds of equipment. Specialized structures are used in optical apparatus, the basic elements of which are discussed in Chapter 3. For a description of the apparatus itself, see Volume 11. Because very little information on this subject is available in the literature, references to one or two handbooks of optics must suffice. Generally, the catalogues issued by specialized companies, which contain full particulars of components on the market, together with the range of sizes available, are a fruitful source of information.

The rational system of units and symbols (ISO), as defined in Volume 1, Chapter 1, has been used throughout.