Guest Editorial

An intuitive grasp of mechanics existed in ancient man, who found that he could extend the capabilities of his own body through the use of tools. The beginnings of a more systematic understanding of statics is usually attributed to Archimedes, but the development of dynamics was delayed until after the renaissance. Specifically, Galileo is credited with making dynamics an exact science of motion. His work in mechanics marks the beginning of modern science, with controlled experiments conducted to verify theory. Newton not only discovered the laws of motion but also the mathematical language of differential calculus, an indispensable tool for describing the velocity and acceleration of bodies. A deeper understanding of mechanics resulted from the work of Euler, Bernoulli, Lagrange, and others between the seventeenth and nineteenth centuries. Classical mechanics is the foundation upon which the more recent developments of relativistic and quantum mechanics rest, shedding light on, respectively, cosmic and corpuscular phenomena.

In the age of the digital computer and of other sophisticated business machines, the exciting results achieved with semiconductor devices in reducing size and power requirements and in increasing speed have tended to overshadow the continuing and extensive use of classical mechanics. Both in computing systems themselves (especially in peripheral devices) and in the manufacture of computers, challenging problems are overcome almost daily by clever applications of the principles of mechanics. The papers in this issue report some examples.

The first paper, by J. A. Paivanas and J. K. Hassan (p. 361), involves an application of fluid mechanics; it describes a system for transporting the silicon wafers on which computer circuits are formed to their various processing stations. Another paper, by K. E. Petersen (p. 376), is much more directly concerned with silicon; in this case, the author describes how micromechanical devices, such as switches, are being formed by processing silicon.

Many of the papers report solutions to problems in computer output printers. One by H. C. Lee and J. W. Raider (p. 386) describes how flexural wave propagation was used to absorb impact energy in a printer. J. H. Meier and J. W. Raider (p. 392) report their analysis of an "interposer"; its use allowed the speed of a printer to be doubled. The tradeoffs involved in the design of a printer subassembly are discussed by J. L. Zable (p. 396), and the dynamic response of a print belt system is investigated by P. A. Engel, H. C. Lee, and J. L. Zable (p. 403). An effective but simple method was devised by E. F. Helinski (p. 411) for packing printer ribbon after its use.

W. D. Clark (p. 415) analyzes a surprisingly complex mechanism for scanning documents in a copier. R. H. Taylor (p. 424) presents both improvements over an existing method and a basically new technique for achieving straight line trajectories in the movements of computer controlled manipulators.

Fluid dynamics principles are used in the study of a problem by D. B. Bogy, J. E. Fromm, and F. E. Talke (p. 437)—the occurrence of undesirable gaps in otherwise evenly spaced flexible disks in a disk pack. Finally, a paper by D. B. Bogy, N. Bugdayci, and F. E. Talke (p. 450) is in the area of the mechanics of materials; they determine experimentally the creep functions of thin orthotropic polymer films.

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