

AUTOMATION IN THE ACCOUNTING SYSTEMS OF
SMALL MANUFACTURING CORPORATIONS

by

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CHAPTER I
INTRODUCTION

Current Machine Application

Business machines are no longer a luxury in any business or industrial office. Each year various new time-saving machines are invented and developed which accelerate the office routine, insure accuracy, and meet the growing development of duplications and computations in business and industry.¹

The ever-increasing cost of office and accounting work and the ever-mounting losses to business through fraud, defalcations, errors, and even embezzlement have made it imperative for management, and particularly the chief accounting officer, to seek quicker, better, and cheaper methods of doing the large volume of paper work and accounting recording demanded by present business operations.²

The mechanized accounting department is the very foundation of modern management control techniques, and the very

¹Earl W. Atkinson and Kenneth A. Romey, A Laboratory Manual in Business Machines (Dubuque, Iowa: Wm. C. Brown Company, 1953), p. iii.

²John J. W. Neuner and Ulrich J. Neuner, Accounting Systems: Installation Methods and Procedures (3rd ed.; Scranton, Pennsylvania: International Textbook Company, 1959), p. 3.

world we live in shows us the productive contribution mechanization has made to our lives.

Yet it is still not uncommon to find a factory equipped with all that is "up-to-the-last-minute," working along side an office which would have presented no surprises to the grandfathers of those now employed within it.³

The situation of the smaller concern is exemplified by the statement of Mr. Sam D. Pollack, Executive Vice President, Vaco Products Company, Chicago, Illinois, concerning their situation.

Every day, small companies like ours are being absorbed by larger corporations--or being forced to close up shop due to increasing business costs. We foresaw this situation some years ago, however, when we determined that, if we were to keep up with this rapidly-changing business scene, we would have to "work smarter" than ever before. . . . We knew that if we were to "work smarter," we'd need more information at our fingertips. We knew that this information would have to be accurate and timely. We also knew that it would cost us a considerable amount of money to do the job manually; so we began to do more of the work on modern business machines.⁴

The field of mechanization, or automation, is no longer considered new. . . . As clerical costs continue to rise and personnel become more difficult to obtain, the need for mechanization becomes greater, and with the varied equipment available there is a decreasing field of excuses for not mechanizing.⁵

³O. Sutton, Machine Accounting (3rd ed.; London: MacDonald & Evans Ltd., 1959), p. 6.

⁴Sam D. Pollack, "Business Machines Help Small Company 'Work Smarter'," Journal of Machine Accounting, Vol. 15, No. 12 (December, 1964), p. 27.

⁵R. C. Barney, "To Mechanize or Not To Mechanize," Journal of Machine Accounting, Vol. 12, No. 9 (September, 1961), pp. 29-33.

Mechanized accounting is approaching its eighth decade of use.⁶ Not many years ago the experts had all but written off the "workhorse" general business machine in favor of the more glamorous and sophisticated electronic data-processing systems. But instead of sitting back and allowing themselves to be pushed from the picture, office machine manufacturers accepted the challenge, made adjustments, and the desk-type devices began to fill a constantly growing demand for an economical adjunct to the computerized systems. Lost ground was recovered and sales have been increasing over the past few years with prospects for additional growth in the future.⁷

Purpose and Scope of Thesis

It is with this rejuvenation of the mechanized accounting in mind that this thesis is prepared. The purpose of this thesis is to discuss the availability and operation of mechanized accounting equipment to fit the requirements and financial limits of the small manufacturing corporation. The scope is limited in most instances to the characteristics of National Cash Register and Burroughs accounting machines and their application to cash transactions, purchases, sales, payrolls, and summary reports and statements.

⁶Sutton, p. 10.

⁷Raymond Brady, Editor, "Thirteenth Annual Office Report," Dun's Review and Modern Industry, Vol. 88, No. 3 (September, 1966), p. 134.

CHAPTER II
FUNDAMENTALS OF AN ACCOUNTING SYSTEM

Definition

An accounting system is an organization of forms, records, and reports, closely coordinated to facilitate business management through determining certain basic and required information.¹

Eric L. Kohler in A Dictionary for Accountants defines an accounting system as:

The classification of accounts, and the books of account, forms, procedures, and controls by which assets, liabilities, revenues, expenses, and the results of transactions generally are recorded and controlled.²

Characteristics

Systems provide a method of standardizing work practices throughout a company and for coordinating the work between departments within the organization. Systems clarify company policy by formalizing top management decisions throughout the organization. Planned systems also (1) eliminate

¹Neuner and Neuner, p. 3.

²Eric L. Kohler, A Dictionary for Accountants (New York: Prentice-Hall, Inc., 1952), p. 421.

unnecessary operations and costs, (2) preplan action to avoid snap decisions or possible incorrect handling of situations, (3) permit measurements of employee productivity on a company-wide basis, and (4) aid cost control by helping to avoid waste and protect company assets.³

An accounting system consists of:

(1) A series of printed forms such as invoices, vouchers, checks, and reports, which are used in establishing certain accounting and office systems and routines, and which are the basis for making accounting entries.

(2) A series of books, or substitutes therefor, in which the original entries are made from these records. These books are the large number of journals that may be used.

(3) A series of ledgers in which the information recorded in the journals is summarized or collected under account headings.

(4) A series of reports or statements such as trial balances, abstracts of ledgers, income statements, and balance sheets.

(5) A series of clerical operations which must be performed in recording the accounting information on forms, journals, and ledgers, and in providing reports and statements.

³Prentice-Hall Editorial Staff, Industrial Accountant's Encyclopedic Dictionary (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964), p. 536.

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(6) An increasing use of machines and equipment to expedite the work, lower the cost of performance, and reduce the possibility of error.⁴

Installation or Improving

In initiating or improving an accounting system, the best start is to forget all about current practice and to ask the following questions:

- (1) What do we want?
- (2) When do we want it?
- (3) How often do we want it?
- (4) Where does it come from?
- (5) Where does it go to?⁵

These questions must first be answered for the system as a whole and then for every single component and document separately.

Certain questions must be answered concerning the nature of the system and in an effort to devise the most inexpensive way of doing the work.

- (1) What is the nature of the business?
- (2) What constitutes the functional or departmental organization of the firm?
- (3) What forms are used to record the orders, sales, purchases, cash receipts, cash payments, and other business transactions?
- (4) What accounting entries should be made from these forms?
- (5) What is the most inexpensive, yet best, way to record these entries?
- (6) What personnel will be required to perform the work?

⁴Neuner and Neuner, p. 4.

⁵Sutton, p. 10.

- (7) What provision is made to prevent possible mistakes, fraud, or defalcations?
- (8) What statements are to be made from the accounting records?
- (9) Can this information be obtained quickly and inexpensively from the entries made?
- (10) Will it be necessary or desirable to prepare a Manual of Accounting Procedure to be sure that the work is done correctly?
- (11) How long should it take to install this system and have it operate smoothly?
- (12) What supervisory work will be required of the accountant installing the system?⁶

The following basic principles should govern the building or revision of an accounting system:

- (1) Preparation and analysis of the daily and monthly business transactions that will take place.
- (2) The best means, proper forms and records, of recording and summarizing the transactions.
- (3) The necessity of establishing internal checks, and the method of installing them to safeguard the assets and the firm.
- (4) Recording in the books, books of original entry and books of final entry, the transactions collected on the forms. Underlying all these entries is the use of mechanical equipment which will facilitate the making of the entries in journal form or in ledger form.
- (5) Determining what statements and statistical reports are to be prepared from the accounting records.
- (6) Provision for continuous internal audits and periodical external audits of the accounting system.
- (7) Provision for presenting the information accurately, quickly, and inexpensively for government or regulatory reports.⁷

The accounting systems work may be done by an outside firm of public accountants, by representatives of accounting

⁶Neuner and Neuner, pp. 8-9.

⁷Ibid., pp. 11-13.

and office-appliance manufacturers, or by members of the firm's regular accounting or systems and procedures staff. When the reviewer or analyst is sure of the facts concerning the system, he is faced with the problem of developing the solution. In all the preceding questions asked, particular attention should be paid to the "Why?" questions. An unsatisfactory or weak answer may suggest that the particular step in the system be eliminated, combined, changed in sequence, or simplified.⁸

Recognition of the needs of top management for accounting information must not be neglected by the accountants installing or revising the accounting system. The accounting information recorded and the reports prepared therefrom should be so planned that management will be able to direct the business activities intelligently to increase the profits.⁹

It is with these principles in mind that the automation of corporations' accounting systems has become a necessary part of the operations of business today. For the small companies to keep from getting absorbed by the larger ones, mechanization is a necessary part of modernization.

⁸Oscar S. Nelson and Richard S. Woods, Accounting Systems Design and Installation (Cincinnati, Ohio: South-Western Publishing Company, 1961), pp. 226-227.

⁹Neuner and Neuner, pp. 13-14.

Chart of Accounts

The work done on an accounting system should include some plan of coding that will enable quick and easy reference to the accounts being used. The plan of coding may use numbers, letters, or a combination of numbers and letters. A design of a chart of accounts should be one of the first subjects for attention in the work done on an accounting system. The chart of accounts is the key to information wanted by the management of a concern in the form of statements and reports taken from the ledger records. A good system of coding:

- (1) Locates accounts quickly.
- (2) Reduces time for writing identity of accounts.
- (3) Aids in classifying transactions.
- (4) Is easy to remember or identify.
- (5) Allows for adding or dropping accounts.¹⁰

Figure 1 shows an illustrative chart of accounts.¹¹

Ledgerless Bookkeeping

The use of document copies as accounts receivable ledger sheets has been an accepted procedure for many years. The usual method is to file invoice copies, by customer, in a tub

¹⁰J. Brooks Heckert and Harry D. Kerrigan, Accounting Systems Design and Installations (2nd ed.; New York: The Ronald Press Company, 1953), pp. 61-62, 66.

¹¹Gregorio T. Eleosida, "Organizing An I.B.M. Data Processing Center," (unpublished Master's thesis, Graduate School, Texas Technological College, 1962), 85 pp.

Acc. No.		Acc. No.		Acc. No.		Acc. No.	
300	SALES (30)	708	Automobile Expense	790	Interest Paid	876	Taxes Income Federal
				792	Interest Earned	878	Taxes Income Local
						880	Taxes Income State
		710	Bad Debt Expense			882	Taxes Unemployment Fed
		712	Bank Service Charge	794	Janitor	884	Taxes Unemployment State
		714	Bonus			886	Taxes Franchise
						888	Taxes Property
				796	Laundry	890	Taxes Other
		715	Cleaning	798	Legal and Accounting	892	Taxes NYS Disability
		716	Commission Income	800	Licenses	894	Telegraph
		718	Commissions	802	Loss on Sale of Assets	896	Telephone
		720	Contract Labor			898	Travel and Entertainment A
		722	Contributions			900	Travel and Entertainment B
530	Returns and Allowances			804	Maintenance Machine	902	Travel and Entertainment C
533	Discounts Allowed			806	Maintenance Shop Equipment	904	Travel and Entertainment D
540	State Tax Commission	724	Delivery Expense	808	Maintenance Building	914	Travel
543	Sales Commissions	726	Depreciation Office Equip	810	Maintenance Truck	916	Travel and Entertainment
570	Freight	728	Depreciation	812	Maintenance Furn Fixtures		
575	Over and Short	730	Depreciation Auto	814	Maintenance Auto		
		732	Depreciation Auto Truck	816	Maintenance Auto Truck		
		734	Depreciation Building	818	Miscellaneous Admin Exp	918	Utilities
		736	Depreciation Furn Fixtures	820	Miscellaneous Other Income		
		738	Depreciation Machine	822	Miscellaneous Other Expense		
		740	Depreciation Shop Equipment	824	Miscellaneous Sales Expense		
600	COST OF SALES (34)	742	Depreciation Trucks			920	Wages
601	Beginning Inventory	744	Directors Fee	826	Office Supplies	922	Water
		748	Discounts Allowed	828	Outside Services		
		752	Discounts Taken	830	Over and Short		
		754	Dividends				
				832	Payroll Clerical		
				834	Payroll Maintenance	930	OTHER INCOME (36)
				836	Payroll Shop	931	Commission Income
				838	Payroll Supervision	933	Discounts Taken
				840	Postage	935	Gain on Sale of Assets
		756	Dues and Subscriptions			937	Interest Earned
		758	Employee Welfare			938	Miscellaneous Other Income
		760	Entertainment				
		762	Equipment Rental	842	Rent		
				844	Repair and Maintenance		
		764	Freight	846	Salaries		
		766	Fuel	848	Salaries Salesmen	975	OTHER EXPENSES (36X)
				850	Salaries Officers	977	Discounts Allowed
		768	Gain on Sale of Assets	852	Salaries Executive	979	Interest Paid
		770	Group Insurance	854	Sales Promotion	981	Loss on Sale of Assets
				856	Salesman Auto Expense	982	Miscellaneous Other Expense
				858	Sewer		
		772	Heat Power and Light	860	Shop Supplies		
				862	Stationery Supplies		
		773	Insurance	864	Supplies		
		774	Insurance Liability				
		776	Insurance Life	866	Taxes		
		778	Insurance Fire Theft	868	Taxes Capital Stock		
		780	Insurance Building	870	Taxes Payroll		
700	OPERATING EXPENSES (38)	782	Insurance Work Compensatn	872	Taxes Real Estate		
702	Advertising	784	Insurance Other	874	Taxes P I C A		
704	Amortization Leasehold Imp	786	Insurance Auto				
706	Answering Service	788	Interest				

Fig. 1 (continued)

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file.¹² The copy of the customer's invoice is credited with payments; and when fully paid, the invoice is removed from the accounts receivable file.

It is also possible to operate the entire system of production costing for materials on a ledgerless basis, using files of stores requisitions, and materials returns vouchers in lieu of (1) detailed job or departmental cost ledgers, (2) detailed inventory accounts, and (3) storeroom stock cards.¹³

In the proper environment, ledgerless bookkeeping systems can save a substantial amount of clerical effort. The system is not particularly suited to firms that receive partial payment on accounts receivable due to the increased clerical work of manually posting the partial payments and filling out partial payment receipts.

¹² Editorial Board of Prentice-Hall Professional Accounting Publications, Accountant's Encyclopedia Volume II. (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1962), p. 740.

¹³ Nelson and Woods, p. 429.

CHAPTER III
MACHINE OPERATIONS

Definition

As discussed previously, modern accounting systems involve, to a greater or lesser degree, the use of some form of mechanical devices. Accounting machines are used because they expedite the work (that is, eliminate present delays in the work), reduce the cost of doing the work, provide for better control of the records involved, and prove the work accurately.¹

Many different machines are used in many different offices. The term "accounting machines" as used in this paper refers to any machine that is used to prepare basic accounting records, such as journals, ledgers, statements, and other records and reports, and is capable of arithmetical operations.²

Accounting machines may be divided into three broad categories:

(1) Nondescriptive machines. These machines record

¹Neuner and Neuner, pp. 17-18, 144.

²Eldred A. Johnson, Accounting Systems in Modern Business (New York: McGraw-Hill Book Co., Inc., 1959), p. 165.

numerical data but do not have a typewriting mechanism with which to write descriptive entries. They are used primarily for posting to ledger cards, but they can be used for any type of bookkeeping work which does not require a completely itemized description of the entries. The machines are basically adaptations of the adding machine, with a wide carriage and some form of tabulation. Fig. 2 shows a Burroughs' nondescriptive machine.

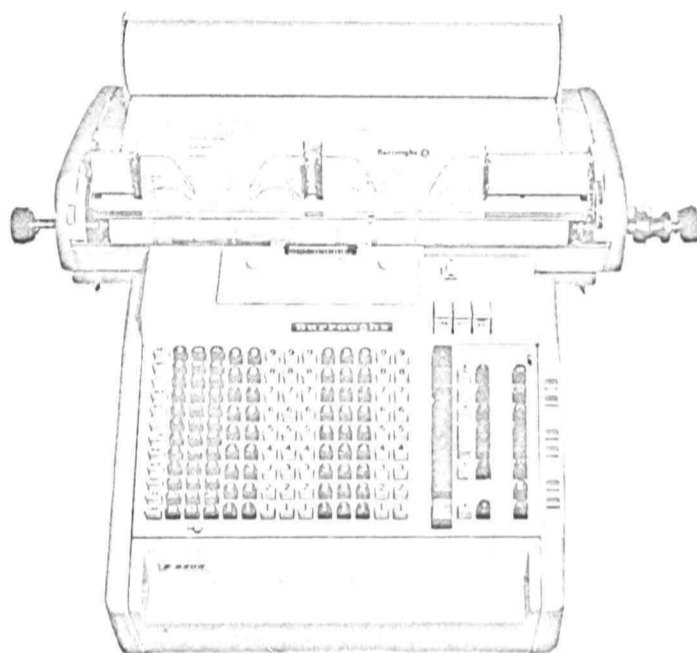


Fig. 2--A Burroughs' nondescriptive machine.

(2) Descriptive machines. These are equipped with a typewriter keyboard as well as an adding or computing mechanism. They can be used in preparing journal records, or summaries, and invoice and payroll records; in fact, in any type of accounting work requiring the typing of names, descriptions, or other accounting detail. This type of machine is essentially a combination typewriter and adding machine,

or typewriter and computing machine. Fig. 3 shows a Burroughs' descriptive, or alphanumeric, machine.

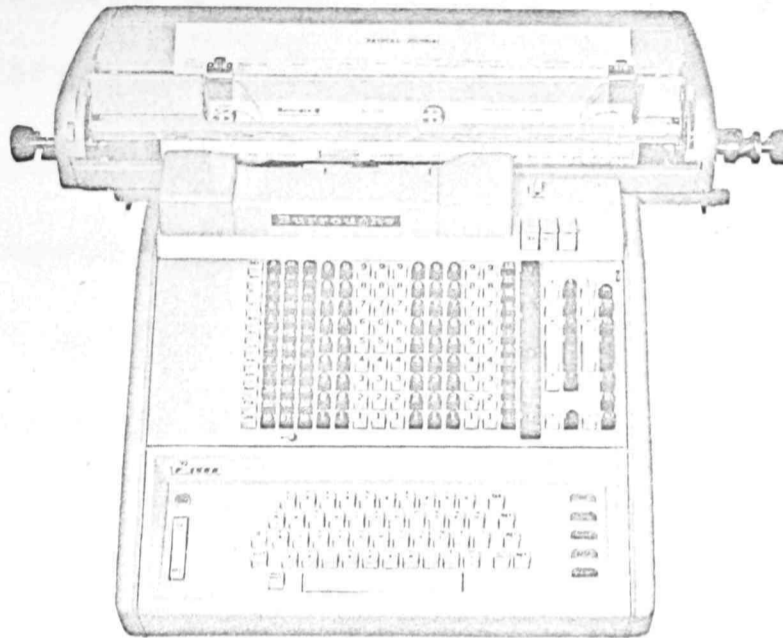


Fig. 3--A Burroughs' descriptive machine.

(3) Punched-card machines. These comprise a special group of machines that record accounting and statistical data on specially designed and coded cards by means of punched holes.³

According to the definition, a simple adding machine is an accounting machine. Even an adding machine that could accommodate only tape-width documents could be used to prepare monthly statements to customers, listing the charges, the credits, and the resulting balance. The adding machine could be made more versatile by the use of a moving carriage which will accept wide sheets.⁴

³Neuner and Neuner, pp. 144-147.

⁴Johnson, pp. 166-167.

These listing-adding machines, also known as non-descriptive machines, are adequate in simple posting situations. They are basically adding-and-subtracting machines with movable carriages wide enough to handle ledger forms. The machines are electrically driven; and the carriage can be set to move automatically from left to right, starting and stopping in conformity with the columnar scheme of the ledger. Printing of debit and credit and resulting balance is a continuous operation, once the machine operator has depressed the appropriate keys on the keyboard. Figures only are printed, but special keys are provided that print dates and certain symbols such as BAL, CR, J/E, CSH, FRT, EXP, DIS, and C/D. These machines produce a customer's statement as a by-product, the carbonized duplicate serves as the ledger record, and statements are ready for mailing as soon as the last day's posting is finished.⁵

Capable of more detail and more versatile work than the listing-adding machines are the so-called "alphanumeric bookkeeping" machines, or descriptive machines. These machines have two keyboards, one a typewriter keyboard, and another, a computer keyboard. Because these machines can write up several different forms simultaneously, including posting accounts, they are called "bookkeeping" machines instead of "posting" machines.⁶ Descriptive machines are

⁵ Heckert and Kerrigan, pp. 219-220.

⁶ Ibid., pp. 220-221.

especially practical in the preparation of the cash receipts journal, cash disbursements journal, sales register, voucher register, perpetual inventory records, and payroll records.

Installation Considerations

Certain of the factors that should be considered in making an accounting machine installation are:

- (1) The volume of each class of transactions.
- (2) The cost of handling the transactions under the present method.
- (3) The cost of handling the work under the proposed machine method.
- (4) The adequacy of the methods of internal control under the present and under the proposed methods.
- (5) The possibility of effecting combinations of operations when machines are used.
- (6) The possibility of eliminating duplication of reports and operations.
- (7) The possibility of expediting the accounting work and the preparation of reports.
- (8) The possibility of reducing the number of errors in the work.⁷

After the previously listed factors have been determined, certain principles should underlie the selection and use of mechanical devices:

(1) Office appliances should be installed whenever they will reduce the actual cost of doing the accounting work, and these cost savings must be evident in the payroll.

(2) The savings realized by the use of these mechanical devices must be sufficient to pay for the devices within a period of not more than one or two years.

⁷Neuner and Neuner, p. 152.

(3) Mechanical devices should be used wherever the nature of the work is repetitive and monotonous. The use of the machines tends to motivate the work so that the work is less monotonous.

(4) Mechanical devices result in more accurate work through mechanical and automatic checks of the tremendous volume of work the machines perform.

(5) Without the time-saving factor of mechanical devices, much of the billing, accounts receivable, statements, and payroll work could never be completed within any reasonable length of time.

(6) Finally, in selecting and using mechanical devices, the accounting department must of necessity standardize on certain models or types of machines because of the ease of training operators, measuring and controlling output, and reducing costs of machine service and maintenance.⁸

Machines have not been developed which will completely eliminate the human element. The original documents must be placed in process in the machines by human beings, and the documents must be produced for human beings to use. The mechanical appliances are valuable aids in the operation of a modern accounting system because they:

(1) Standardize accounting operations and methods of handling transactions. The work is subdivided and each operator becomes highly efficient; the best methods for

⁸Neuner and Neuner, pp. 137-138.

handling transactions are determined and followed; and the responsibility for operations is localized.

(2) Provide neater and more uniform records.

(3) Eliminate errors in recording and posting transactions.

(4) Facilitate speedy handling of large volumes of transactions.

(5) Provide an economical method of handling transactions.

(6) Procure detailed analyses not possible or practical to obtain in any other manner.

(7) Release brain power for more constructive work. The accountant, by having all the details collected in almost any fashion he wishes, can concentrate upon the problem of presenting the facts to employees and executives in statement and report form.⁹

Accounting machines are designed for accuracy, neatness, and speed in doing any of the numerous tasks for which they can be adapted in almost any type of business. The applications are almost unlimited due to the installation of desirable code keys, exchangeable program bars, and the use of the numerous types of forms available. Machines also have additional strong points in their favor. They are a major factor in strengthening the internal control of the firm using them; and their cost is much less, both the initial

⁹Neuner and Neuner, pp. 135-136.

cost and the cost of operation. R. C. Barney points out that:

An entrant to the field of automation must keep in mind that increasing the speed of issuance is not the primary purpose of mechanization. A manual procedure placed on machines only increases the speed of the previous inaccuracies, or, as is often stated, "If we start with garbage, we will issue refined garbage." Among the primary reasons for mechanizing are:

- (1) Reduction of direct and indirect clerical costs.
- (2) Production of more timely and accurate information.
- (3) Provide for more rapid solution of complex mathematical problems.¹⁰

In contrasting machine and manual accounting, machines make a tremendous contribution to the accuracy within any accounting system, and their neatness far exceeds that of the human element; but speed, perhaps, is the greatest point of difference between machines and human beings. Machine operation is also a major factor in internal control in that the records are checked automatically as they pass from one processing station to the next in their flow through the accounting system. As to cost, the machine system is again favored, for the principle holds true that machine labor is cheaper than human labor. The rule of thumb which has been previously used is that a new piece of office equipment should pay for itself in one or two years in savings in salaries of clerical personnel.¹¹

¹⁰Barney, pp. 29-33.

¹¹Johnson, pp. 114-115.

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An example of the results of the application of machine accounting is given by Mr. Sam D. Pollack, Executive Vice President, Vaco Products Company.

The number of man-hours required to process the payroll has been cut by 60 per cent with these machines. Our invoicing, ledger card posting (Accounts Receivable), and statistical analysis is completed in one machine run, thereby reducing the man-hours required for those operations by another 40 per cent.¹²

Characteristics

Almost all accounting machines are capable of concurrently accumulating amounts entered in the vertical columns of an accounting record or report. These adding-machine units which total across the page are known as crossfooters. In addition to the crossfooting function, many accounting machines may also accumulate the amounts entered in the various columns and may carry the totals to the foot of each column where they may be printed.

The adding-machine units which add down the columns are called registers. Each crossfooter or register accumulates the figures entered in it. The more columns which can be added simultaneously by a machine, the more flexible and useful and expensive will the machine be.

The crossfooters and registers are incorporated into accounting machines in two principal means of operation:

¹²Pollack, p. 28.

(1) manual and (2) automatic, involving the "mechanical brain."¹³

In the manual method, the operator directly supervises every move of the machine. The carriage is manually spaced or tabbed to every position, and the amounts keyed into the machine are added or subtracted in any desired register or crossfoot-select key or motor bar.

The "mechanical brain" used in the machines in the automatic mode of operation is similar in appearance and function to the tabulating bar of a typewriter; however, it is much more complex. This device is known as the control or program bar. Fig. 4 shows an example of a machine with four control bars built into a single machine. The appropriate machine application is selected simply by changing the number on the control bar selector. Some machines

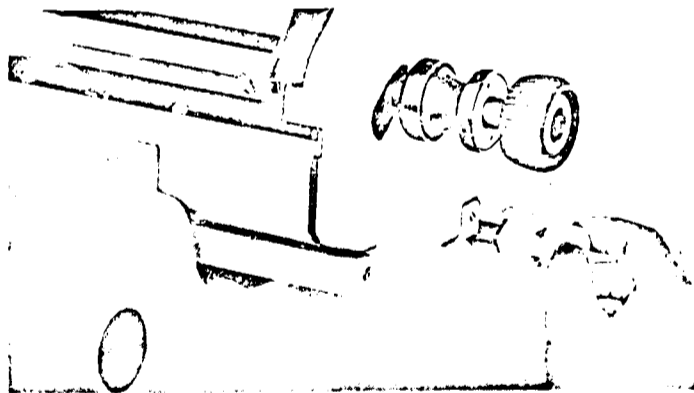


Fig. 4--A machine's program control bar.

have more than one such bar. When the carriage moves to a tab stop, the machine senses (by means of mechanical "fingers" in most machines) the position, size, and shape of the

¹³Johnson, p. 173.

increments on the bar clustered around the tab stop. By means of these increments, the control bar may be programmed to "tell" the machine to do any one or more of the numerous functions of the machine. A new series of tab stops must be set up for each application (payroll, accounts receivable, etc.) by changing the control bar within the machine.

Most standard accounting machines are programmed by means of interchangeable program bars that control the movement of the carriage, the addition or subtraction of data to accumulator or register totals, the printing of register totals, and the clearance of registers to zero.

One of the basic operating principles of accounting machines is the pickup of ledger balances prior to posting, and the repeat of this pickup to obtain proof of posting accuracy. This requirement is eliminated in electronic balance-pickup machines.¹⁴ Ledger cards used in this type of equipment are printed with stripes of magnetizable material on the back. During the operation of the accounting machine, the account number and account balance are recorded as magnetized spots that can be read and printed automatically the next time the ledger card is used. Fig. 5 shows the reverse side of a ledger card with the magnetized stripes.

One of the primary considerations to be considered in selecting any accounting machine is the method of checking, or "proving," the work desired. Because of the large volume

¹⁴ Editorial Board of Prentice-Hall Professional Accounting Publications, pp. 743-744.

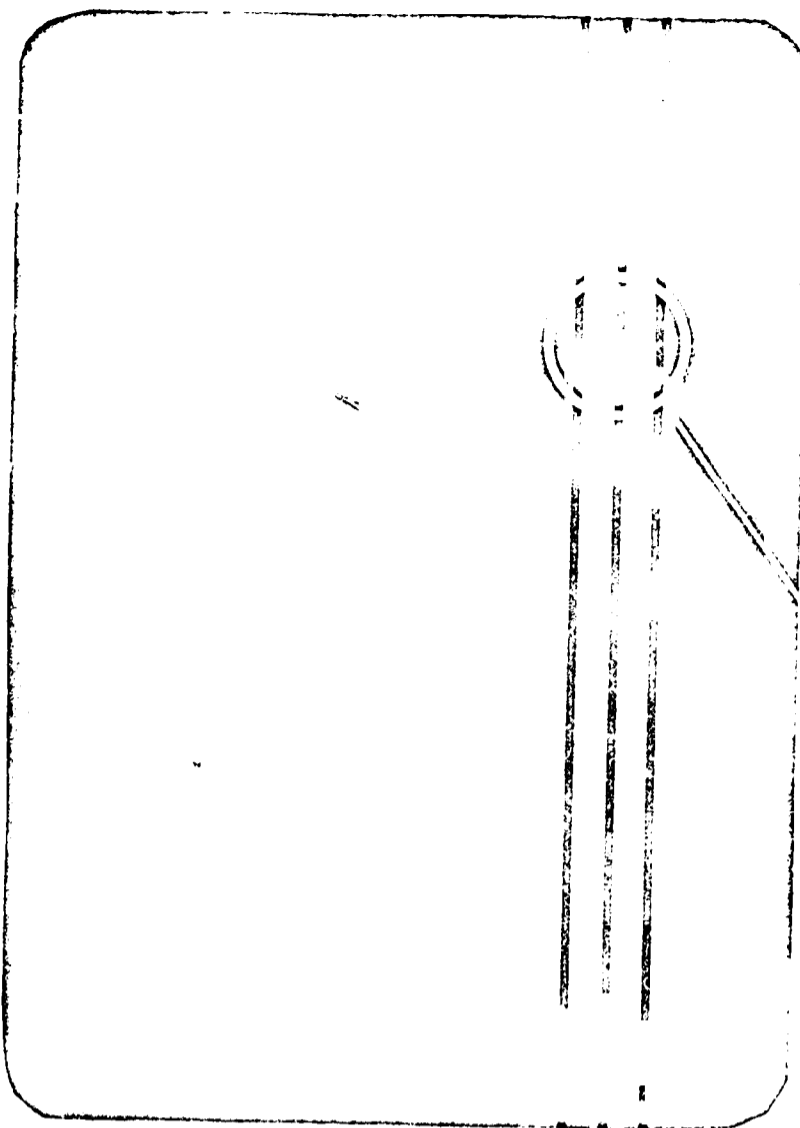


Fig. 5--A magnetic striped ledger card.

of work done with accounting machines, it is absolutely necessary that a "proof" be set up to prove the accuracy of the work. Five commonly used methods of proving the work done on posting machines are the:

- (1) Indirect proof method.
- (2) Split-platen, or direct-proof, method.
- (3) Proof sheet.
- (4) Mechanical line proof.
- (5) Recap proof method.¹⁵

In the indirect proof method, a prelisting is made of all the debits or credits to be posted. After these have been posted to the cards, the new and old balances of all

¹⁵Sutton, pp. 65-73.

the ledger cards to which postings have been made are tabulated on an adding machine, adding the new balances after posting and subtracting the old balances before posting. If this posting agrees with the prelisting, it is assumed that the total charges have been posted to some account, but not necessarily to the correct ledger or customer's account.

The split-plate, or direct proof, method is similar in principle to the indirect proof method, but is completed as the entries are made, and does not require a recapitulation of old and new balances. A split-plate on the machine operates an adding machine tape, on which is recorded the old balance as a subtraction. When this old balance is subtracted from the new balance on the ledger card after the posting, the difference should be the posted amount. At the completion of the posting work, the list of figures on the adding machine tape must agree with the prelisting of the charges. This then becomes the "proof."

The proof sheet method consists of using either carbons or duplicate registers to simultaneously prepare the proof sheet with the postings to the ledger cards.

Mechanical line proof is a very popular mechanical posting-proving method which relies on the assumption that if a thing is done twice with the same result, it has been done correctly. This proof indicates whether the right amount has been placed in the machine by clearing the machine when the original posting is placed in the machine a second time. If the proper amount has been posted to the ledger

card, the second insertion of the amount automatically clears the machine. If an error has occurred, the machine will refuse to print, or in some instances the registers will show a balance, thus indicating an error.

In the recap proof method a listing and total is made of the old balances on all the ledger cards to which postings were made. A second listing is then made of the new balances on the cards and totaled; the difference between these two totals should agree with the total of the prelistings.

Machine posting is done directly from original debit and credit media. Direct posting by machine takes numerous forms, with variations of the random and sorted methods being followed according to the needs of different firms. Direct posting may also be accomplished concurrently with statement preparation. The concurrent posting of the accounts and preparation of the statements is usually referred to as the unit plan.¹⁶ This is convenient in situations where statements must be kept up to date and ready for transmittal to customers at any time the customer wishes. Statement and ledger card are placed side by side in the bookkeeping machine, and the sales slips are posted to both, after picking up the customer's old balance in the machine. The operator posts once for each underlying document, and the machine automatically reproduces the same information on the statement. In some situations the ledger is reproduced as a

¹⁶Nelson and Woods, p. 318.

carbon copy of the statement. After posting and proving, the original statements are mailed to the customers; and the new ledger cards, identical with the statement, are filed in the accounts receivable trays.

CHAPTER IV
MACHINE FORMS, BOOKS OF ENTRY, AND FILES

Importance of Proper Forms

Forms have been described both as "the silent partners in a business" and as "red tape," but the fact remains that large-scale business activities could not take place today without the many forms and papers which have been devised to establish a smoothly functioning system of recording and responsibility.¹

The forms used are as necessary with mechanical equipment as with manual devices, and the form to be used is a more difficult problem when mechanical equipment is involved. The forms have to be designed with due regard for the various items of equipment whose operations have to be coordinated. Attention has to be given to such matters as size of the form, location on the form of the various units of data, and machine requirements as to line selection and vertical spacing. If the machines are equipped with a magnetic striped ledger pickup, then this has to be considered when determining the forms needed.²

¹Neuner and Neuner, p. 49.

²Nelson and Woods, p. 131.

Forms are used primarily:

- (1) To fix responsibility for the creation, recording, or completion of business transactions;
- (2) To reduce the possibility of errors by "putting it in writing;"
- (3) To transmit essential information from one person to another within the same organization or in another firm;
- (4) To record past or completed transactions.

Four basic principles govern the use of forms:

- (1) Whenever something must be recorded as a matter of necessity, such as orders, requests, records, invoices, etc., a form should be used.
- (2) When certain information must be recorded repeatedly, the use of forms reduces the time required to write the information.
- (3) A form should be used when it is necessary to have related information in the same place, because this makes possible a prompt check on the completeness of the record.
- (4) A form should be used to fix responsibility.³

Below are some of the basic principles which govern the number and nature of the original records and forms to be used in an accounting system:

- (1) Determine by experience and judgment the number of original records necessary and use as few original records as possible.
- (2) Make use of duplicate copies of various original records whenever possible.
- (3) Data, once gathered at its source, should be entered on the records to serve the purpose of all departments to avoid duplication in gathering of data.

³Neuner and Neuner, p. 52.

- (4) Use simplicity and conciseness in design to eliminate all unnecessary information and make the original records as simple as possible.
- (5) Design the original records for ease in collecting the data for bookkeeping records.
- (6) Design the original records with the internal-check phase of the accounting system in mind.
- (7) Design the original records so they furnish the necessary data for statistical reports.
- (8) Design the original records to facilitate the making of the annual external audit.⁴

The completion of any particular form may serve several purposes. For example, one copy of a sales invoice may be sent to the customer, a second copy may be used for the entry in the sales register, and a third copy may be used in preparing the customer's ledger. Thus, by a single writing and the use of carbon paper and multiple forms, three records are taken care of.

An example of the application of a multiple form is given by Mr. Sam D. Pollack, Executive Vice President, Vaco Products Company:

Essentially, our objective is to obtain as much information from each business statistic and each business operation as possible. One manner of doing this, we found, is to make a single machine operation, on a single business form, accomplish a variety of purposes. Our nine-part invoice is an example. The first three copies are an original and two carbons of the invoice. The fourth copy is a bookkeeping copy; the fifth, a salesman's copy; and the sixth, a commission copy. The seventh copy is a work order; the eighth, a packing list; and the ninth, a shipping file copy. Once completed in a single run through our Compu-Tronic, the data on this order will never have to be retranscribed to any other document. The savings

⁴Neuner and Neuner, pp. 50-51.

in time and the elimination of possible transcription errors is obvious.⁵

Every action in business is controlled by pieces of paper; and a business form, by standardizing information and by eliminating as much of the writing, typing, checking, re-writing, and retyping as possible, is supposed to streamline and shortcut these pieces of paper. Forms may range from a simple two-part cash receipt, with one copy to the purchaser and the other copy for the file, to carefully designed twenty-part combination documents for invoice, shipping, bill of lading, and inventory. The important thing to remember in dealing with forms control is that for every \$1 spent on the purchase of forms, some \$20 to \$150 is spent in processing the forms.⁶

In many offices it seems that the managers believe that an increase in the output of the forms, records of various types, and paper work is a measure of increased efficiency. The fact is that in the typical office there are too many forms. Many of the forms contain too much information and seem to be designed to confuse and slow down the workers and to increase the likelihood of error.

In an effort to correct some of the inefficient uses of forms, a forms-control program should be initiated to periodically check on the effectiveness of the forms program which is in operation. The objectives of a forms-control

⁵Pollack, p. 28.

⁶Brady (Editor), p. 151.

program are:

- (1) To cut down paper work.
- (2) To eliminate paper work.
- (3) To consolidate information.
- (4) To simplify procedures.
- (5) To reduce printing and distribution costs.⁷

After determining the use and the number and nature of the forms in accordance with the previous principles, it is necessary to design the forms. Forms must be designed for a particular business. Each form must clearly indicate its purpose, command attention, and provide a place for the date.

A form should also:

- (1) Contain a specific amount and kind of information.
- (2) Make entering the required information easy.
- (3) Make using the data it contains easy.
- (4) Be reproduced as economically as possible.
- (5) Be designed to minimize the possibility of error.⁸

There are numerous types of forms available. Single sheets of paper, arranged in pad form or boxed, are commonly known as flat forms. These are the simplest and the cheapest to produce. Forms with more than one part are known as multicopy forms. Multicopy forms are more expensive to produce, but they often reduce clerical costs so much that they are worth many times the additional expense. There are various

⁷Clarence B. Randall, Sally W. Weimer, and Maynard S. Greenfield, Systems and Procedures for Automated Accounting (Cincinnati, Ohio: South-Western Publishing Co., 1962), p.25.

⁸Ibid., p. 26.

arrangements of sets of multicopy forms. Specially arranged forms can eliminate many handling steps, including inserting and removing carbons, positioning separate forms into alignment, inserting and removing single copies of forms from the typewriter, and aligning separated forms in the typewriter.

- (1) Collated forms are multiple-copy forms which are padded in sets according to color of paper or number.
- (2) Unit-set forms have carbon paper inserted between the copies of each set with the forms and carbon paper held in place by a stub.
- (3) Continuous-strip forms are continuous sets of identical forms separated by perforation.
- (4) The fanfold form has the individual parts of each set connected at the sides by a "fanfold" or "accordion" arrangement.⁹

Forms are usually tailor-made; and the copy for every form should be prepared carefully, with complete specifications given. The printer must know precisely what is to be done, and he should not have to determine the final design of the form. This is the job of the individual who is responsible for the form. Before the job of producing the form is given to a printer, the possibility of producing the job on the mimeograph, ditto, or any other duplicating devices available in the office should be considered.

Forms should be purchased in the largest quantities possible, but with these reservations in mind:

- (1) Forms which are likely to become obsolete quickly should be bought in small quantities

⁹Randall, Weimer, and Maynard, pp. 29-30.

- regardless of higher unit cost, for this is cheaper than scrapping a large quantity.
- (2) Storage and handling of a large quantity of forms usually amounts to about 10% of the cost of the form.
 - (3) Additional clerical record keeping is involved in keeping an inventory of forms.¹⁰

Forms are a necessity for the successful operation of a mechanized accounting system; but the design, use, and installation of the proper forms must be dealt with intelligently and in proper relation to the needs of the particular company.

The small business can get helpful ideas on forms design from local business-forms distributors, who in turn can draw upon the resources of many manufacturers. Almost all local printers and all forms manufacturers offer stock business forms for standard applications such as purchase orders and bills of lading, and will also accommodate simple variations of stock format to fit special situations.

Books of Entry

Books of original entry, also known only as journals, are those in which the first accounting entries are made. The entries, usually more complete than in any other record, are arranged in chronological order, and have explanations in considerable detail. The journal represents one of the first permanent accounting records of a business transaction.

¹⁰Randall, Weimer, and Maynard, pp. 27-28.

Journals

The journal may be in either bound or loose-leaf form, and is subject to marked variation with respect to technical details. As ordinarily used the journal may be said to have two functions:

- (1) It presents, in terms of a chronological sequence of transactions, the debit and credit entries.
- (2) It furnishes brief details in connection with each transaction.¹¹

The journal may also serve as an index of the ledger or ledgers.¹²

Since journals are the first accounting record, the system must be devised so that no entries will be omitted, and so that the original entry will be complete with explanations, dates, etc., in order that the entry may be readily identified and traced to its original source.

There are certain principles or requisites of the accounting system that refer particularly to journals:

- (1) There must be a sufficient number of journals to enable the firm to employ a sufficient number of persons to do the work promptly.
- (2) The journals will be used to separate the transactions into certain basic classifications, such as cash receipts, cash payments, sales, and purchases.

¹¹William A. Paton, Essentials of Accounting (Revised Edition; New York: The MacMillan Company, 1949), p. 119.

¹²Christian Oehler, Lawyers' Accounting Handbook (Albany, New York: Matthew Bender and Company, Inc., 1952), p. 17.

- (3) To reduce the amount of detailed posting work, special columns should be used whenever the corresponding debits or credits occur repeatedly, thus permitting posting of columnar totals instead of detailed figures.
- (4) The column headings should correspond to the names of the accounts to which the totals will be posted.
- (5) Columns are used as the basis of obtaining figures for the summary or control accounts. In such instances, a careful check must be made of the dual posting--in total to the control accounts and in detail to the subsidiary ledger accounts.
- (6) Wherever possible, journals should be set up in such a way that the need for transcribing transactions from the original records is eliminated. For example, duplicate copies of the sales invoices, put into a loose-leaf binder, may well serve as the sales journal without any further effort on the part of the bookkeeping staff.
- (7) A relationship must be established between certain original records and the journals, whereby definite responsibility can be assigned to certain individuals.¹³

A great variety of journal forms are used in practice.

A journal may take the form of an adding machine tape; it may be a sheet of paper representing a transcript of entries written as a by-product of machine posting to a ledger; or it may represent one of the many variations of the more formal columnar journals.

Several of the journals used in most businesses include:

- (1) Purchases journal or invoice (or voucher) register.
- (2) Sales journal or sales register.
- (3) Cash disbursements journal or check register.

¹³Neuner and Neuner, pp. 77-78.

- (4) Cash receipts journal.
- (5) General journal.¹⁴

All concerns keep a general journal, even though the use of special journals varies widely among individual companies. The general journal contains detail information of all items of original entry not otherwise entered in the special journals. The usual entries appearing in the general journal are adjustments for prepayments, accruals, and amortization, entries to record the flow of materials or merchandise through the production and sales line, closing and reversing entries, and corrections. A business having few and irregular transactions may well use only a general journal; but as the growth of the business increases the related and frequently occurring transactions, the need for specialized journals develops.

Special journals are designed to record the different classes of transactions. These journals may be of simple or multi-column ruling. The advantage of the special columns is to permit postings of columnar totals rather than individual items, thus speeding up the posting process as well as eliminating to some extent the possibility of posting errors. Some of the advantages of special journals are:

- (1) They make possible an increased use of the special-column device, since each special journal can have its own special columns.
- (2) They enable more than one bookkeeper to

¹⁴Johnson, pp. 1-2.

- work at journalizing in cases where one person could not do all the work alone.
- (3) They bring about all the advantages of division of labor, such as increased expertness and elimination of loss of time in changing from one operation to another.
 - (4) They are a great aid in establishing systems of internal check, since no one person has complete charge of all entries.
 - (5) They produce direct summaries of important classes of transactions, such as cash receipts.
 - (6) They make reference to specific transactions easier, since all transactions of one kind are together and attention may be concentrated on finding the particular item.¹⁵

Figure 6 shows various simple and multi-column journals.

Ledgers

The accounts of a firm are recorded in the books of final entry known as the ledgers. The ledgers sort and summarize the debits and credits of the journal compactly under the various account headings.¹⁶ The ledger accounts contain the basic facts concerning the results of the operations of the business. These are the records of assets, liabilities, net worth, income, and expense.

Several of the functions of ledgers are:

- (1) To summarize information in such form that income statements and balance sheets, together with any necessary supporting data, may be prepared.

¹⁵William A. Paton, Editor, Accountants' Handbook (3rd ed.; New York: The Ronald Press Co., 1946), p. 139.

¹⁶Ibid., p. 124.

PURCHASE JOURNAL													
PREVIOUS BALANCE	DATE	NUMBER	DEBIT	CREDIT	BALANCE	1 PREVIOUS BALANCE	2 DEPT. 1	3 DEPT. 2	4 DEPT. 3	5 TAX	6 ACCT. NO.	7 GENERAL LEDGER	OO PROOF
50000	MAY 4 60	1420	12050		62050	50000		10000	2050		509	1250	.00
25000	MAY 4 60	915	1250		3750	2500		1000	6500				.00
14000	MAY 4 60	2037	15000		29000	14000		1000					.00
20000	MAY 8 60	890	4250		24250	20000		4130		120			.00
			32550										
			.00										
			.00										
			.00										

CASH DISBURSEMENT JOURNAL													
PREVIOUS BALANCE	DATE	NUMBER	DEBIT	CREDIT	BALANCE	1 PREVIOUS BALANCE	2 BANK	3 DISCOUNT	4 FREIGHT	5 ALLOW. AMOUNTS	6 ACCT. NO.	7 GENERAL LEDGER	OO PROOF
8150	MAY 29 60	798		3150	5000	8150	3000		150				.00
25000	MAY 29 60	799		15000	10000	25000	14700	300					.00
5000	MAY 29 60	800		5000	.00	5000	1250	100					.00
19500	MAY 29 60	801		12000	7500	19500	4900			2000			.00
3750	MAY 29 60	802		2500	1750	3750	10000	50					.00
	MAY 29 60	803					2450						.00
			.00										
			.00										
			.00										

Fig. 6 (Continued)

- (2) To give current information with regard to the status of the various things owned by, or owed by, the business, and of the current operating activities.
- (3) To serve as an index to the journals (or daybooks), so that the necessary paid checks, bills, invoices, contracts, etc., may be traced and examined.¹⁷

The ledger accounts are divided into two classifications, the general ledger accounts and the subsidiary accounts.

The general ledger, also called the principal book of accounts, contains all of the information needed for a concern's financial statements--at least the top financial summaries.¹⁸ The position of the general ledger as a source of account information depends upon whether it is the only ledger or is supported by subsidiary ledgers. The greater the number of subsidiary ledger accounts, the more the information contained in the general ledger is summary in nature. The size of the company, and thus the number of ledger accounts, also determines whether the company uses the general ledger as the source of all the financial information, or whether the general ledger is used only for summary information and the detailed information comes from the subsidiary ledgers.

A subsidiary ledger is a specialized record with all the accounts in any particular subsidiary ledger belonging to the same group or class. In principle, any account in the general ledger can be supported by a subsidiary ledger.

¹⁷Oehler, p. 17.

¹⁸Heckert and Kerrigan, p. 77.

The subsidiary ledger shows in detail the information shown in summary in the general ledger control account.

The following is a list of some of the special ledgers that might be found in a manufacturing company:

- (1) Cash subsidiary records.
- (2) Receivables subsidiary records.
- (3) Inventory subsidiary records.
- (4) Prepaid expense subsidiary records.
- (5) Property, plant, and equipment subsidiary records.
- (6) Payables subsidiary records.
- (7) Owners' equity accounts subsidiary records.
- (8) Subsidiary ledgers for selling, general, administrative expenses.¹⁹

For some of the items listed above, it would be sufficient to use the ledgerless bookkeeping procedures which have already been discussed. Figure 7 shows several mechanized ledger records.

Files

The selection of files and housings to maintain the accounting records is a matter of extreme importance, particularly in subsidiary ledgers, many of which contain hundreds (or thousands) of accounts. The problem is one of convenience and economy of operation.

There are various files and housings used; but the main ones for use with mechanized accounting devices are:

- (1) Visible index records. These may be maintained in book form, in a filing cabinet from which a tray or shelf slides out for

¹⁹Johnson, pp. 21-39.

NAME		Beaver Mfg. Co., 25 S. Main Street, Any City		SHEET NO. A	
ADDRESS				RATING	
				CREDIT LIMIT	
DATE	NUMBER	DEBIT	CREDIT	BALANCE	PREVIOUS BALANCE
MAR 12 60	1540	30.00		30.00	
MAR 30 60	437		30.00	.00	30.00
APR 21 60	2701	15.40		15.40	
APR 30 60	650		15.40	.00	15.40
MAY 16 60	3109	25.00		25.00	
MAY 28 60	3245	12.50		37.50	25.00
MAY 29 60	803		25.00	12.50	37.50

NAME		Mr. John J. Jackson		ACCOUNT NUMBER 8844	
ADDRESS		1357 Orchard Road		CREDIT LIMIT \$ 500.00	
DATE	SYMBOLS	CHARGE	CREDIT	BALANCE	PREVIOUS BALANCE
1 DEC 10-5	ch 43987 B	••269.95			
2 DEC 10-5	ch B	•••21.60			
3 DEC 10-5	ch B	•••••8.10		•••••299.65 S	•••••264.00
4 DEC 10-5	ch B		•••35.65	•••••264.00	•••••264.00
5 JAN 10-5	ch B		•••22.00	•••••242.00	•••••242.00
6 FEB -8-5	ch A		•••22.00	•••••220.00	•••••220.00
7 MAR 12-5	ch B		•••22.00	•••••198.00	•••••198.00
8 APR -6-5	ch B		•••22.00	•••••176.00	•••••176.00
9 APR 10-5	ch 55442 B	••129.95			
10 APR 10-5	ch B	•••10.40			
11 APR 10-5	ch B	•••••3.90		•••••320.25 S	•••••308.00
12 APR 10-5	ch B		•••12.25	•••••308.00	•••••308.00
13 MAY -9-5	ch B		•••33.00	•••••275.00	•••••275.00
14 JUN 12-5	ch A		•••33.00	•••••242.00	
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
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LEDGER						SHEET NO. 2	
NAME		Mr. William Fox		RATING		A	
ADDRESS		205 Walnut Street, Any City		CREDIT LIMIT		200	
OLD BALANCE	DATE	FOLIO	DEBITS	CREDITS	BALANCE		
50.00	APR 26 63	1203	32.00		82.00	S	
82.00	APR 27 63	140		2.00 Ch	80.00	S	
80.00	MAY 3 63	1795	20.00		100.00	S	
100.00	MAY 8 63	2040	5.00		105.00	S	
105.00	MAY 10 63	650		80.00	25.00	S	
25.00	MAY 31 63	3105	15.00		40.00	S	

Fig. 7--Mechanized ledger accounts.

- use, or in a stand which permits rotating the sections in which the records are kept.
- (2) Ledger trays. These are especially practical for machine posting to ledger cards because of the ease with which the cards can be removed, placed in the machine, and returned to the file.²⁰

In selecting the appropriate equipment, consideration is first given to what work needs to be done: the manner and frequency of posting, taking trial balances, and the referencing to which the accounts will be subject. These factors considered, the devices that will meet the requirements for the least cost are selected.

Figure 8 shows an example of a visible index record and two examples of ledger trays.

²⁰Neuner and Neuner, pp. 152-153.

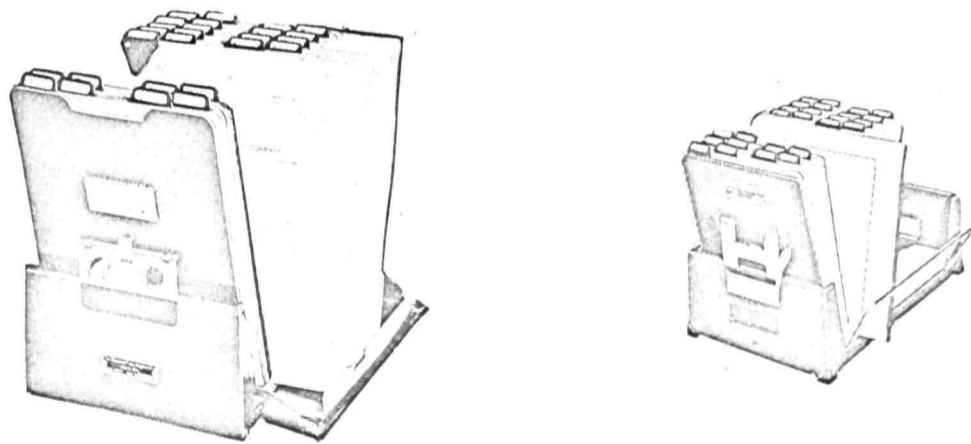
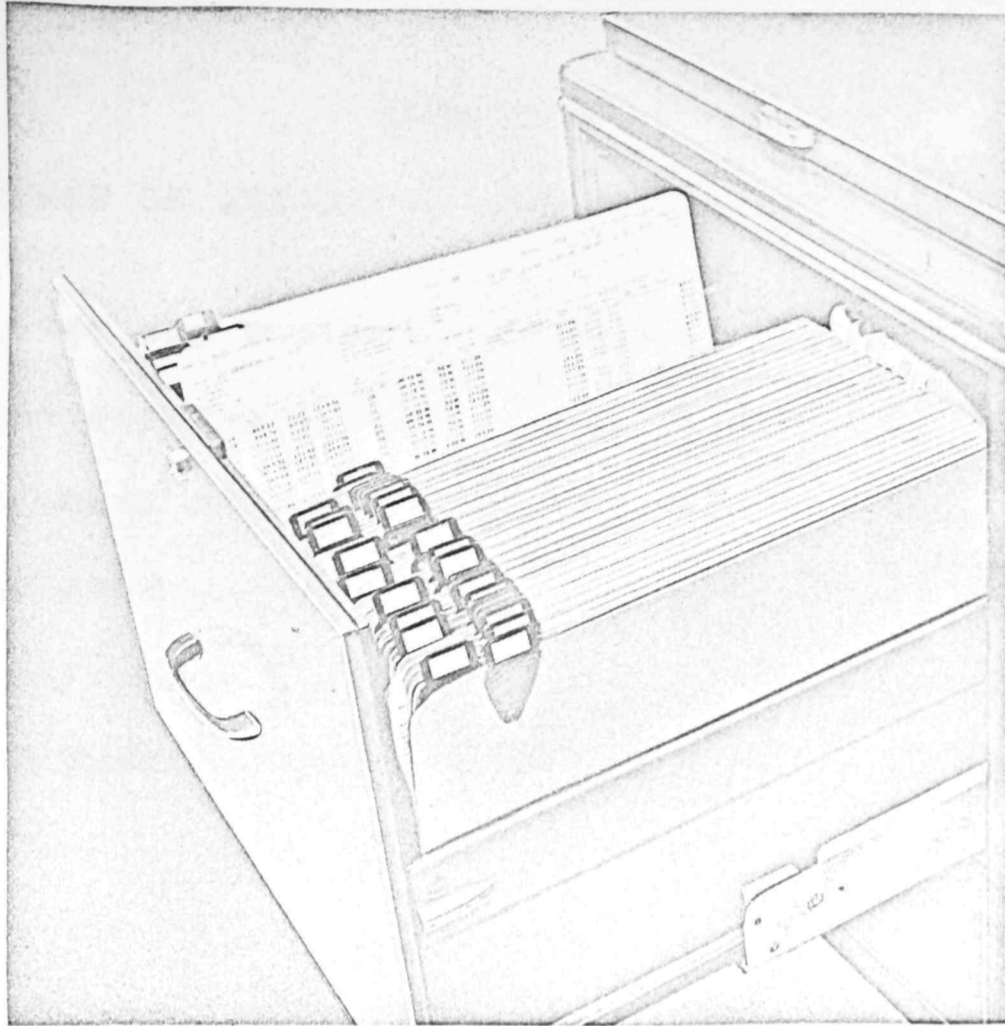


Fig. 8--Mechanical file equipment.

CHAPTER V

TYPES OF AUTOMATED ACCOUNTING EQUIPMENT

In almost any business or company today, handwritten or typewritten records are no longer adequate to meet the increasing demands of the accounting systems being used. Accounting methods differ according to the kind and extent of the transactions and according to the method of keeping records. For this reason, various types of accounting machines are now in use; and there are numerous other mechanical devices that may or may not be used to complement the accounting machines in an automated accounting system.

The principal mechanical appliances used in connection with accounting are as follows:

- (1) Adding and calculating machines.
- (2) Billing machines.
- (3) Addressing machines.
- (4) Check protectors.
- (5) Check signing machines.
- (6) Filing equipment.
- (7) Cash registers.
- (8) Time-recording machines.
- (9) Bookkeeping machines.
- (10) Punch-card equipment.
- (11) Payroll computation tables.¹

Also maintaining an important place in the accounting system are the office copiers and duplicators, the dictation

¹Neuner and Neuner, p. 136.

equipment, and the electric typewriters.² All of these machines have made tremendous advances in the last few years in an effort to keep stride with the demands placed on them by the businesses they serve.

In the preparation of business papers, such as invoices, statements, vouchers, and customers' ledger cards, use must be made of typewriters, adding and calculating machines, computing or adding typewriter billing machines, addressing machines, and a variety of filing equipment, particularly of the visible index or ledger card tray types.

In the preparation of checks for payments on account, for dividends on stock, or payrolls, use must be made of checkwriting equipment, check signing equipment, addressing equipment, and bookkeeping machines which will prepare the checks, the ledger entries, and the original journal entries simultaneously.

In accounting for cash receipts, use must be made of adding and calculating equipment, cash registers, bookkeeping machines, and special ledger filing equipment. In the preparation of payroll records and forms, use will be made of time-recording devices, payroll computation tables, and check writing and check signing equipment.

The description and application of all the previously listed mechanized appliances is beyond the scope of this

²Brady (Editor), p. 134.

thesis. The remainder of this chapter will be devoted to the description of several of the automated accounting machines available today. The next chapter will discuss the application of these machines to the operations of a business.

Automated Accounting Machines

Burroughs F 5000

The Burroughs F 5000 is specifically designed to handle all accounting jobs that require simultaneous, original printing of identical data on two records.

Some of the features of the F 5000 are:

(1) Simplified form handling. Completely adjustable, self-squaring form guides permit easy one-hand form insertion. Optional snap-on, front form guide assemblies that are specifically adjusted to fit your forms may be used. The operator has full visibility of form headings and posting lines.

(2) Split platen. The split platen permits the F 5000 to be used on applications requiring independent vertical spacing of two forms. The split platen may also be used as a single platen. The split platen can accommodate practically any combination of form sizes.

(3) Dual printing heads. They operate simultaneously and provide original print on two records in a single, speedy operation. Since less time is required per account handled, costs are reduced and productivity is increased. In addition, through the Burroughs Program Control Center,

the printing heads can be programmed to operate independently where selective printing is required.

(4) Flexible date section. A flexible calendar section satisfies all requirements for date printing: (a) month, day, and year keys may be released with each operation for indexing a new date; (b) day key only may be released for day change; (c) complete date may be locked in for full repeat printing.

(5) Simplified numeric keyboard. Standard full numeric keyboard is logically arranged for high productivity. Keyboard features light, positive key depressions and short-cut indexing through simultaneous key depressions. All zeros are automatic. Keyboard is designed at a comfortable reading angle to permit easy audit and is arranged for left to right hand travel to permit an easy one-hand operation.

(6) Random access memory selection. Memory selection keys, conveniently located next to the numeric keyboard, permit the operator to random select all memory locations, enabling direct data analysis and distribution. Detail and accumulated amounts are coded for easy identification.

(7) Single purpose motor bars. In any one position on the carriage, each of the four motor bars is programmed to perform a single function. This single-purpose programming minimizes operator decision and errors. The operator does not have to decide whether to depress and release, or to depress and hold down a motor bar. This programming flexibility permits multiple functions from the same motor bar,

yet it offers error-free protection since only one function will be performed by a designated motor bar in each carriage position.

(8) Fingertip carriage control. Control center programming automatically controls the carriage; however, when unusual forms handling is necessary, a fingertip touch of the proper key opens and closes the carriage, and permits the operator to "tab" and "return" directly to any desired column.

(9) Auxiliary adding machine. An easy flick of this control lever instantly converts the F 5000 into a multiple-total adding-subtracting machine, facilitating such operations as proof listing of media and miscellaneous figure work.

The F 5000 is pre-programmed to the individual company's needs with the Burroughs Program Control Center. The Program Control Center directs and controls the printing heads, all carriage movement, and arithmetic functions. The operator enters the data and touches a motor bar--the Program Control Center does the rest, automatically. Each Control Center is programmed to perform a minimum of four different and complete accounting functions. Each Program is instantly available at the turn of the Program Selector Knob. To fit a company's complete requirements, additional Program Control Centers for the same machine will provide as many program combinations as needed.

The Burroughs F 5000 may also be equipped with an internal auditor. This feature can be programmed to protect against operator errors on various applications. It is most frequently used for automatic rejection of incorrect balance pickups. If an error occurs in balance pickups, the F 5000 recognizes the error, rejects the incorrect balances and returns to the proper position for entering the correct amounts.

Another optional feature for the Burroughs F 5000 machines is the Automatic Form Alignment and Ejection. Automatic alignment is accomplished through the sensing of fine-line perforations in the form to be aligned. Upon completion of the posting, forms are automatically ejected for easy operator removal. The alignment perforations do not impede the readability of printed data or reduce the available print area on the forms.

For those companies looking forward to increased growth and the possible installation of data processing equipment, the F 5000 may also be integrated with an Electronic Data Processing System that will capture selected data in punched tape or in punched cards, using punching adjuncts, as a by-product of posting basic accounting records.

Figure 9 shows an example of the Burroughs F 5000.

Burroughs F 1000 Alphanumeric Accounting Machine

The F 1000 Series combines alphabetic description with the traditional high productivity of the Burroughs F 5000 Series accounting machine to give complete alphanumeric

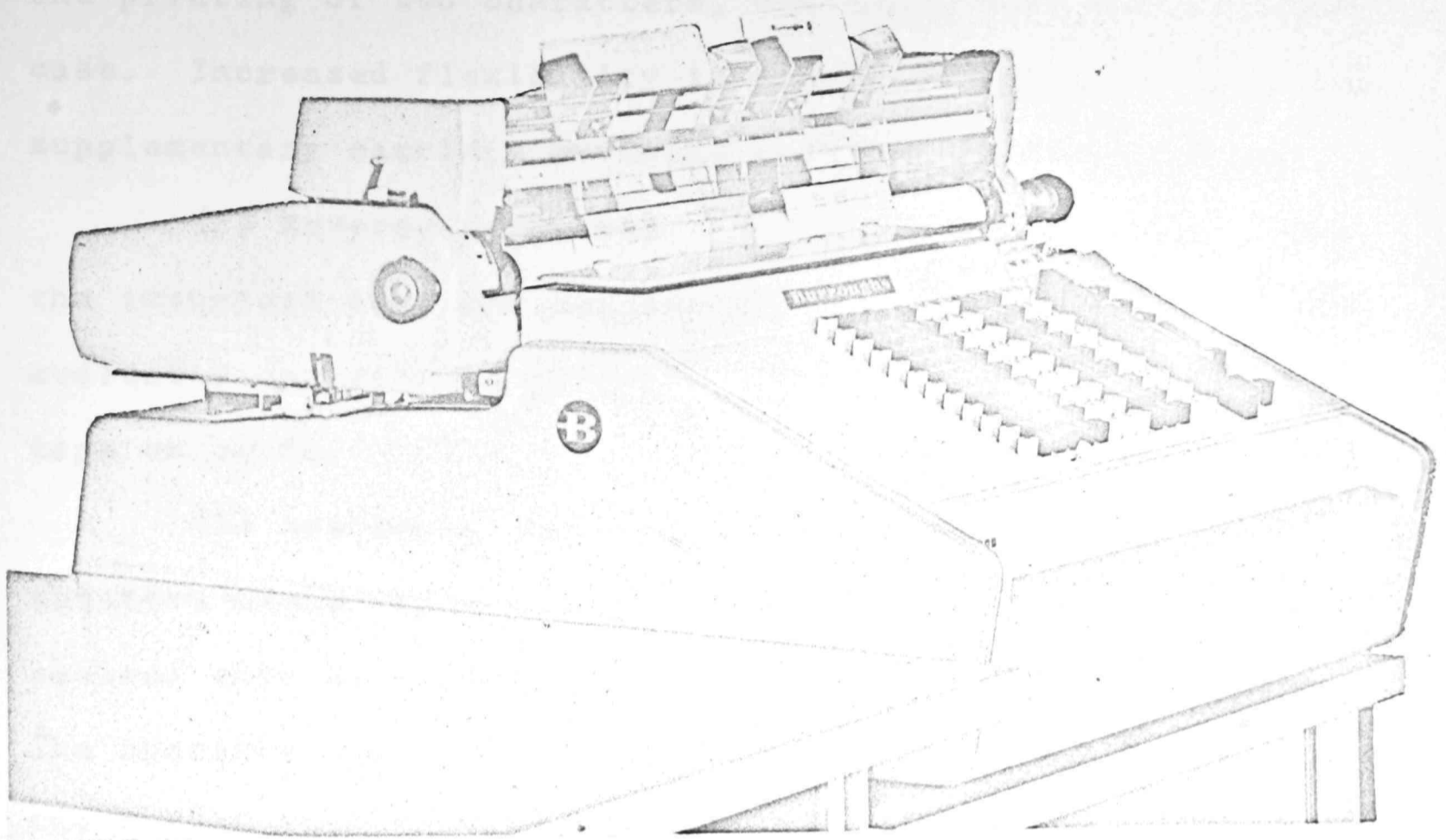


Fig. 9--The Burroughs F 5000.

accounting capability on one machine. The F 1000 has simplified forms handling, split platen, flexible date selection, single purpose motor bars, simplified numeric keyboard, random access memory selection, fingertip carriage control, auxiliary adding machine, internal auditor, Burroughs Program Control Center and Program Selector Knob, automatic form alignment and ejection, and the possibility of tape or card punch attachments as described for the Burroughs F 5000; but some additional features of the F 1000 Series are:

(1) Electric typewriter. The keyboard features a standard arrangement of keys for high-speed touch typing. Each of the forty-two electrified character keys controls

the printing of two characters, one lower case and one upper case. Increased flexibility is provided through electrified supplementary carriage movement and form spacing controls.

(2) Reverse entry key. The operator need only relist the incorrect data and depress the reverse entry key to make auditable corrections on forms, control totals, and punched tape or cards.

(3) Automatic consecutive numbering. Automatic consecutive numbering aids operator productivity in many applications such as payroll, accounts payable, invoicing, etc. The operator need only list the first number in the sequence; the number then advances automatically according to program control.

Burroughs F 1000 alphanumeric accounting machines are designed for those jobs that require alphabetic description in addition to the usual numerical information. The computing and printing of this information on vital original records is accomplished through the use of an accounting machine equipped with a typewriter. Figure 10 shows an example of a Burroughs F 1000 alphanumeric accounting machine.

National Cash Register One-Sixty

The NCR 160 is a very popular nondescriptive accounting machine. Some of the features of the NCR 160 are:

(1) All entries are made directly from the "Live" Keyboard without using a motor bar. Amount and symbol keys operate the machine.

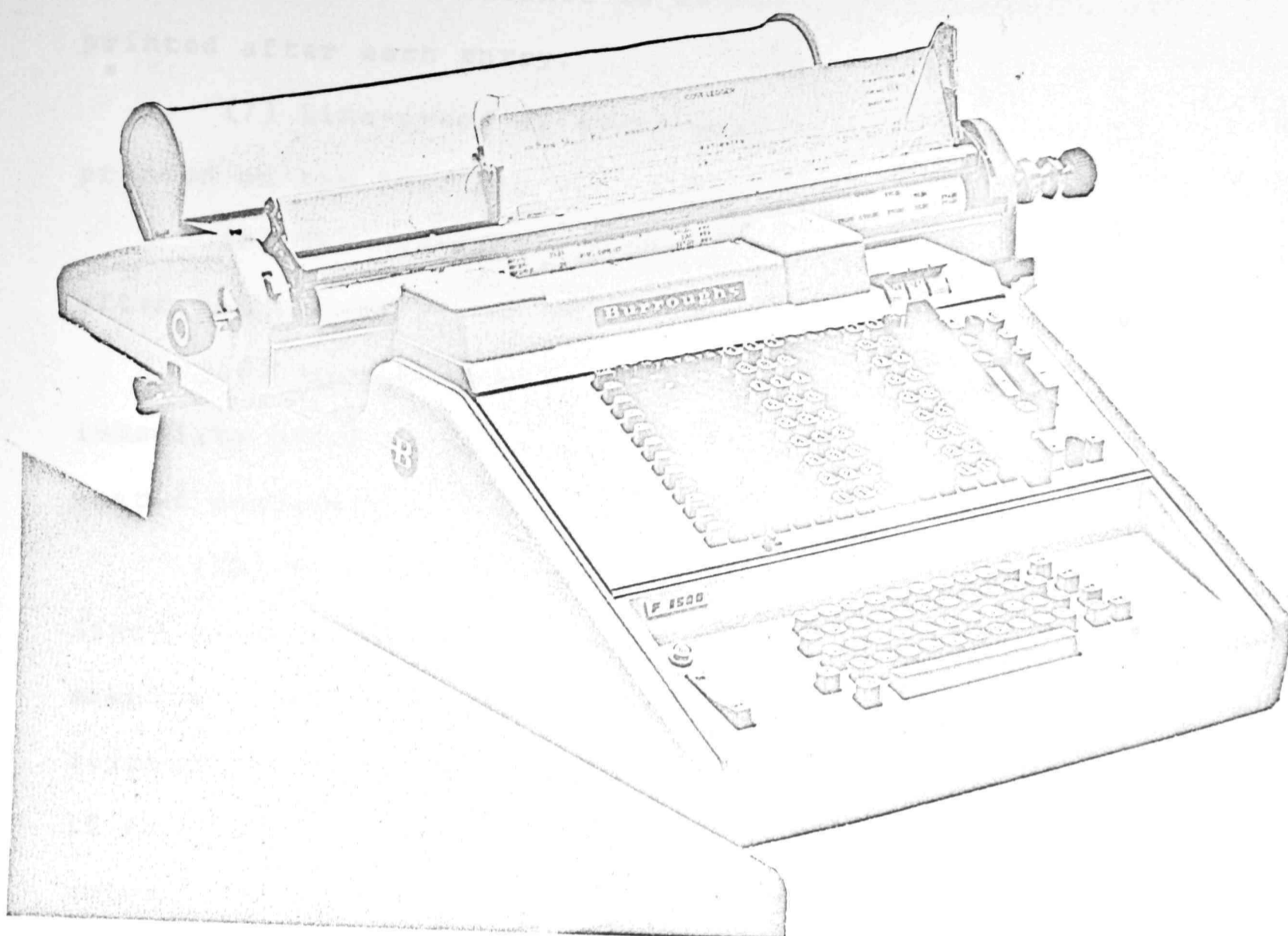


Fig. 10--The Burroughs F 1000.

- (2) National's exclusive "Live" Keyboard automatically "adds" in debit columns, "subtracts" in credit columns, and "non-adds" reference numbers.
- (3) There are no cipher keys to depress. Ciphers and punctuation print automatically.
- (4) The date prints automatically with reference numbers.
- (5) Credits and credit balances print in red.

(6) The new balance is automatically computed and printed after each entry.

(7) Line-proof of every posting is automatically printed on the journal.

(8) The carriage returns and opens automatically after each posting, for quick, easy removal of posted forms.

(9) Amounts posted are automatically accumulated for immediate proof at the end of the run that all items were posted correctly.

(10) By simply moving the appropriate lever, the One-Sixty is converted to a high-speed, all purpose figuring machine. The large Visible Total Dials directly above the keyboard enable the operator to use the machine without tape if desired, or a tape may be used to obtain either a two-column listing with automatic shuttle between columns or a single column listing with group totals and a grand total of all groups.

The NCR One-Sixty is a simple and fast machine for those companies that require only nondescriptive posting entries. Figure 11 is an example of an NCR One-Sixty.

National Cash Register 33

The NCR Class 33 incorporates many advance features and capabilities which make it an extremely versatile, general-purpose accounting machine.

(1) Visibility. There is complete visibility of previous and present postings. Visibility, coupled with

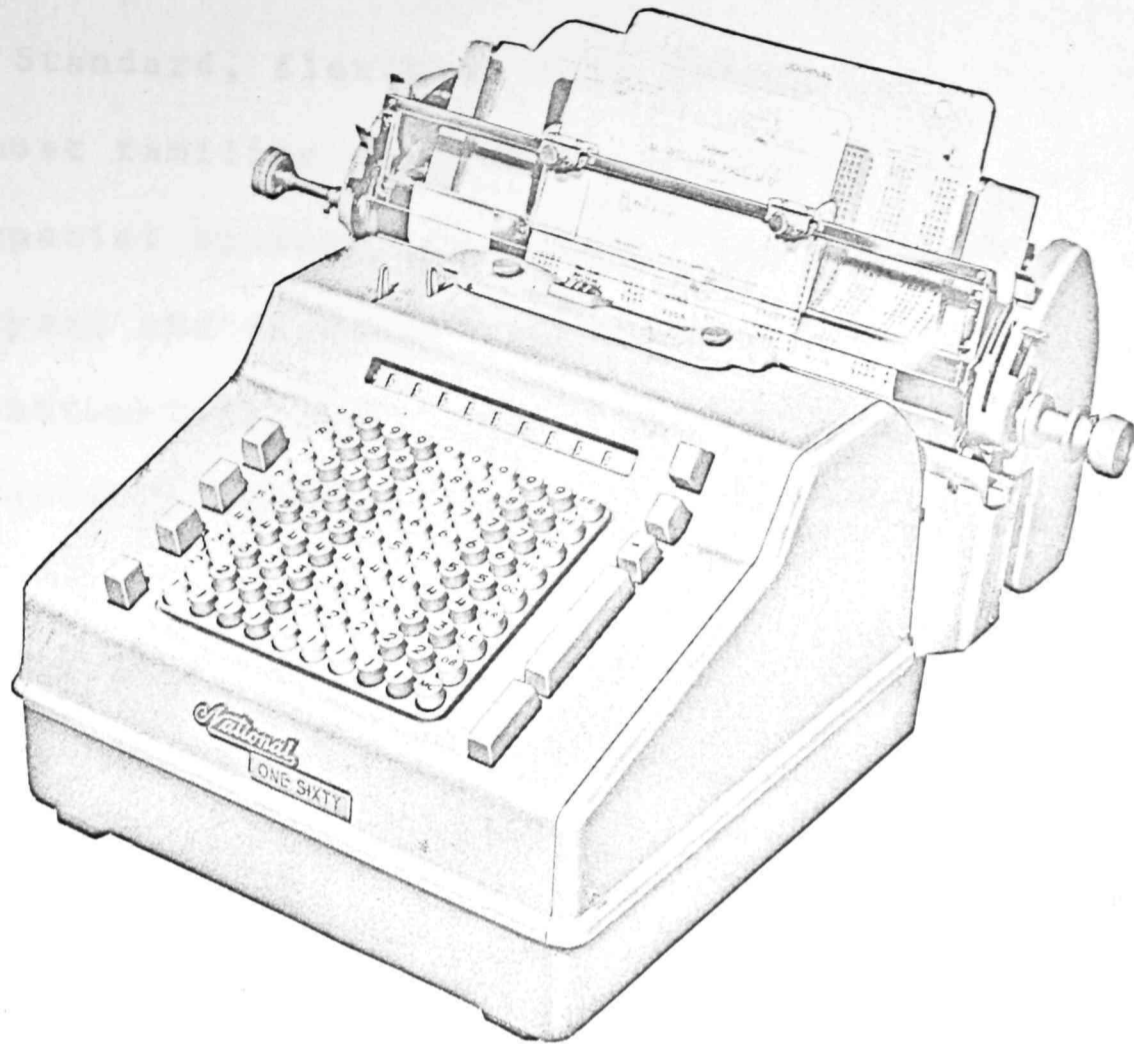


Fig. 11--The National Cash Register One-Sixty.

the ability to type at any position on the records, makes possible the most logical and efficient posting procedure and the most orderly arrangement of columns on all accounting forms.

(2) Visible program index. An integral part of each program bar, this feature permits instant verification of the proper selection and the position of the forms to receive entries. Safeguards against entries being made to the wrong accounting records. Indicates the type of entry that should be made, where printing will occur, encourages confidence, safeguards accuracy, and promotes greater speed of posting.

(3) Standard, flexible, full amount keyboard. The design is most familiar to office personnel, and thus requires no special operator training. The keyboard encourages recording speed and accuracy because all ciphers and punctuation print automatically. Indexed amounts are fully visible and can be quickly verified and errors corrected before printing.

(4) Electric typewriter. Quick, easy action, light touch, quiet, electrically operated keys assist in the suppression of noise and reduction of fatigue. Typing can occur at any position on the accounting forms, including the complete length of the platen.

(5) Instant, reverse entry control. The reversal of any stop controlled entry made in error, is accomplished automatically, regardless of totals affected, by the mere use of one key--the "Reverse Key."

(6) Automatic clearing. Three key-controlled programs--Clear Non-Print, Sub-total, and Clear Print--provides assurance that all totals are clear prior to posting operations and increase form bar capacity.

(7) Selective, enforced distribution. Accounting for amounts to be charged or credited to different special accounts is simply and easily accomplished. Up to 25 totals may be specially assigned and manually selected to augment the control established by "stop." An index labeled with the specific accounting distributions may be provided for

each application. The identity, as well as the control established over the total or totals manually selected, is printed automatically on the posted record.

(8) Motor bars. Only three motor bars are provided. No other motor bars are required due to the numerous functions controlled and determined automatically by the programmable controls built into the "stops."

(9) Three activity counters. Three item counters are provided to give management valuable statistical information. Each has a capacity of 9,999 and can be advanced individually and automatically by any posting operation.

(10) Tab compensator. A tabulation control, used after a typing operation, which eliminates the need for decision to properly position the carriage for the next posting operation, regardless of the number of words or characters typed. Simultaneous vertical spacing can be programmed when required.

(11) Removable program bars. These bars are readily altered to meet changing requirements and easily changed while sitting in normal posting position. They provide flexibility in design of forms and permit a wide variety of applications being placed on the same machine and full utilization of machine time. All posting, error correction, and subtotaling or totaling of the final totals are controlled with only one program bar for each application; thus the risks due to the need to change programs while posting are eliminated.

(12) Programmable skip and reverse tabulation control. In addition to normal forward tabulation, three programmable skip and four reverse tabulation controls are provided.

(13) Automatic "authenticator." Programmable entirely by stop for "reverse" or "forward" tabulation control. Automatically verifies the accuracy of balance pickups, automatically erases these amounts from all affected accumulators in the event the amounts were recorded in error, and automatically positions the carriage--all without the need for thought or effort on the part of the operator.

(14) Automatic "determinator." This stop-controlled feature automatically determines the equality of "positive" or "negative" factors to initiate the proper posting program.

(15) Hydraulically powered carriage. Carriage tabulation, both forward and reverse, is powered by NCR's fluid drive unit. Carriage travel is always smooth, quiet, and at uniform speed, regardless of the length of travel or the position of the carriage.

(16) Split and normal platen. The Class 33 platen can operate in either a "split" or a "normal" manner. When "split," both sides operate independently and when "normal" or "coupled," both sides of the platen operate together as a single unit.

(17) Automatic serial numbering. One or more individual consecutive numbers can be controlled automatically as part of the regular posting operation. Each of the different numbers can be advanced, or repeated, and printed

in as many different positions on the forms as may be required.

(18) Protective printing. The amount printed on any document may be protected automatically by printing the dollar sign (\$) immediately to the left of the dollar amount. Since dollar sign (\$) printing is completely automatic, and "stop" controlled, it may be printed with any amount, and in as many positions on the forms as desired. Irrespective of non-symbol key or total control, a symbol or solid square is printed at the right of the amount.

(19) Automatic elimination of irrelevant factors ("wash out"). Programmable controls automatically eliminate irrelevant amounts which otherwise would require extra machine time, as well as additional thought and effort on the part of the operator.

(20) Totals (memory units). Each total functions as an automatic crossfooter. A true, full capacity balance (no complementary figures) in any total, either debit or credit, is computed and printed automatically. As many as four totals can be selected and affected simultaneously, either add or subtract.

(21) Automatic separate debit and credit balance accumulation or column selection. Separate accumulation of debit and credit balances printed in the same column or automatically printed in separate columns is determined by the control established in the "stop."

The NCR Class 33 Accounting Machine may be equipped with the NCR tape recorder or card punch coupler to provide a company with their own "on premise" NCR Electronic Data Processing System. Figure 12 shows an example of the NCR 33.

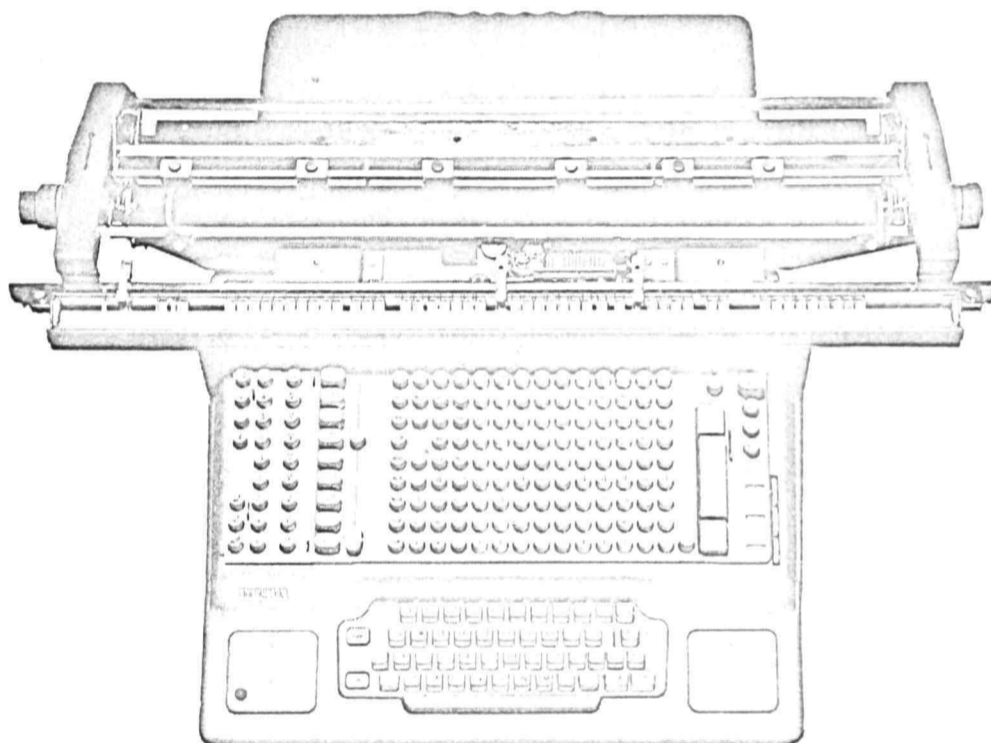


Fig. 12--The National Cash Register 33.

National Cash Register Compu-tronic 35

The Compu-tronic 35 has many of the features described for the NCR 33. Some of the additional features are:

(1) Electronic computation. This feature provides for all computations to be completed and available for printing at split-second speeds. Speed of computation is not altered by the number of digits in the multiplier and multiplicand.

Selective keys permit application of prices on the basis of each, dozens, per hundred, per thousand, etc. Correct decimal punctuation and automatic round-off are internally programmed; taxes, discounts, freight, interest, dividends, commission rates, and many other computations are all handled by the Compu-tronic; and each multiplication is electronically "self-checked" prior to printing.

(2) Product key. The product key provides operators with manual control over the electronics. It permits reading a product at any desired time. It also provides for overriding a column that is normally used for automatic read-out of a computation.

(3) Electronic retention. Significant factors or products can be retained for repeated or subsequent use in other computations in the posting procedure.

The Compu-tronic 35 can also be integrated with the Static Card Reader, which can read electronically all numerical columns of an 80-column punched card for electronic entry of desired data, and punch tape, which records selective data into punched paper as a by-product of posting vital accounting records.

Direct Accounting Computers

These machines are to fill the needs of businesses whose growth requires expanded data processing capability at minimal cost.

Burroughs E 2190

The E 2190 is a self-contained solid state electronic data processing system that gives computer results with accounting machine convenience. The E 2190 offers:

(1) Magnetic ledger stripes. Magnetic ink ledger stripes store pertinent numeric and alphanumeric data such as account number, balances, names, and statical codes in magnetic pulse form. Upon insertion of ledger, numeric and alphanumeric data are read from magnetic stripes into the magnetic core memory. After the operator indexes the variable data, the E 2190, using information from the magnetic stripes, automatically computes, accumulates, and prints numeric and alphanumeric output in any desired format. In many applications, data, such as uniform account payments, can be stored on the magnetic stripes permitting a completely automatic operation. Upon ejection of ledger, machine automatically stores the updated information on the magnetic stripes.

(2) Magnetic core memory. Entire memory capacity may be utilized for constants, factors, data manipulation, and statistical accumulations. Core memory capacity is not required for programming. The memory can accommodate up to 100--12-digit positive or negative words plus sign, or 1300 positions of memory.

(3) Electronic computation. High-speed computations permit greatly accelerated output. In 94 milliseconds, two 12-digit factors can be multiplied or divided. This includes

proper decimal alignment plus rounding and storing of the product in the programmed memory locations.

(4) Automatic decision making. Solid state logic gives the E 2190 powerful automatic decision making ability. The E 2190 can evaluate data and automatically take one of several courses of action. For example, during a payroll operation, the E 2190 will automatically determine whether a fixed deduction is applicable for this pay period and if the employee's earnings for the period are sufficient to cover the deduction amount.

Additional features of the E 2190 are:

(1) Forms handling. The E 2190 accommodate a wide variety of form size and design combinations. Ledgers are automatically squared and aligned. Carriage is designed for full visibility of previous posting and new print-out at all times. Full width print-line is permitted on all striped ledgers.

(2) Programmable all totals key. Programmable all totals key permits vertical or horizontal printing of the contents of memory on management statistical reports. To print the entire 100 words of core memory requires only 39 seconds.

(3) Operator-machine communication system. Convenient, dual purpose switch lamps indicate status of system to operator at all times. Lamps are provided for conditions such as print check, read check, write check, filled check, etc. On systems with punch tape or card output, additional

lamps and control keys are provided for operator control of the punch device from the console.

(4) Clear memory key. A special control key is provided for electronic clearing of all memory locations in less than 1/10 second under program control. Lock protects memory from unauthorized clearing. A positive audit trail is established by a distinctive delta symbol which prints when key is activated.

(5) Reverse entry key. When keyboard entries are incorrectly introduced, reverse entry key permits easy, auditable correction procedure. Operator need only relist incorrect data and depress the reverse entry key. The E 2190 will automatically make required adjustments to data accumulations. No change of program is required.

(6) C and M keys. C and M keys permit multiplying by price per hundred or thousand where normal programming would be by price per unit.

(7) Convenient full keyboard is designed to enable the operator to enter data quickly and easily. Visible keyboard permits easy audit of keyboard data before depression of motor bar.

(8) Decimal indicator lamps. Programmable decimal indicator lamps display correct decimal position to assist the operator in correct indexing of amounts. Indicator lamps permit the entry of mixed decimal amounts with confidence.

(9) Memory address keys. Memory address keys conveniently located next to the numeric keyboard permit the operator to random select all 100 memory locations, enabling direct data analysis and distribution. Use of the memory address keys may be enforced under program control to assure that operator assigns data to memory.

(10) Visible date device. Date dials are easily set and read. Dials have multi-year capacity and may be locked in to prevent unauthorized change.

The E 2190 may also be integrated with the A 4002 Auto Reader and with punched tape or card output, produced as a by-product of regular operations, for an even higher degree of accounting productivity.

The preceding pages have discussed only a few of the numerous mechanized accounting devices available for a company's accounting system. As discussed previously, accounting machines are usually thought of as nondescriptive, descriptive, or punched-card machines. The machines available in any particular class will usually follow the general characteristics and operations of the previously described machines. The machines selected by any particular company will depend upon their particular preferences and requirements.

CHAPTER VI
AUTOMATED MACHINE APPLICATIONS

Cash Transactions

Cash transactions fall into three major groups:

- (a) the receipt of cash, (b) the disbursement of cash, and
- (c) the handling of petty cash expenditures.

In the design of cash receipts procedure, the problem is to establish two harmonious but separate flows. The first is the flow of the physical cash, ending intact in the deposit in the bank. The other is the flow of clerical records, ending unaltered in the accounting department.

Cash receipts posted from a combined typewriter-adding, or typewriter-computing, type of machine, prepare simultaneously in one operation the statement, the cash receipts journal, and the ledger accounts (usually accounts receivable).¹

Figure 13 shows an example of the mechanized handling of cash receipts. Accounts receivable credits are posted to the customer's statement, ledger, and cash receipts journal simultaneously. Other cash receipts may be posted directly

¹Neuner and Neuner, p. 279.

CASH RECEIPTS

.00 ••
.00 ••

PREVIOUS BALANCE	DATE	NUMBER	DEBIT	CREDITS	BALANCE	1 PREVIOUS BALANCE	2 BANK	3 DISCOUNT	4 RETURNS	5 ALLOWANCES	6 ACCT. NO.	7 GENERAL LEDGER	800 PROOF
8000	MAY 29 60	1240		6000LS	2000	8000	5880	1.20					.00 CR
10000	MAY 29 60	1252		10000	.00	10000					126	10000	.00 CR
750	MAY 29 60	1245		250CR	500	750			250				.00 CR
25000	MAY 29 60	1250		20000	5000	25000	19600	4.00		1000			.00 CR
12500	MAY 29 60	1243		2500	10000	12500	1500						.00 CR
9750	MAY 29 60	1241		3750	6000	9750	3675	.75					.00 CR

A

NAME Mr. James Hall SHEET NO. 1
 ADDRESS 511 N. Main Street, RATING A
 ANY City CREDIT LIMIT 200

DATE	NUMBER	DEBIT	CREDIT	BALANCE	PREVIOUS BALANCE
APR 28 60	2034	1250		1250	
APR 30 60	2250	750		2000	1250
MAY 27 60	3045	7750		9750	2000
MAY 29 60	1241		3750	6000	9750

STATEMENT

Any Progressive Company
Anywhere

Mr. James Hall
511 N. Main Street,
ANY City

DATE	REFERENCE	CHARGES	CREDITS	BALANCE
MAY 27 60	3045	7750		9750
MAY 29 60	1241		3750	6000
		BALANCE FWD		2000

Fig. 13--Mechanized cash receipts procedures.

to the journal. The columnar journal provides flexibility for any desired distribution, such as discounts, allowances, claims, interest, bank deposits, and others. Amounts posted in the Bank column are automatically accumulated to balance with the bank deposit. Dates, account balances, and line-by-line zero proof of postings are printed automatically. Credits automatically subtract and print in red; credit balances are automatically computed and printed in red. Statements are always up to date--ready to mail, and the journal is a complete record of all postings.

Every purchase creates a liability and the necessity to pay the liability. The payment of the liability falls under the heading of cash disbursements; and the cash disbursements procedure usually is organized as a separate operating unit with its own immediate head, depending on the size of the firm concerned.²

Figure 14 shows an example of machine preparation of the check register, the voucher check, and the accounts payable ledger card (where a separate creditor's ledger was used) all simultaneously.

Figure 15 shows the simultaneous preparation of the check register and the voucher check only. Under both examples every entry is proved mechanically as it is posted. Dates, balances, and proof figures are printed automatically,

²Heckart and Kerrigan, pp. 299-300.

Burroughs
DEMONSTRATING FORM

IB

PAY TO THE ORDER OF
BUILDERS SUPPLY CO
1280 EVERGREEN
CITY AND STATE

DATE: OCT 27 6-
AMOUNT: 501.27
PROTECTION: 000,501.27*

NO 1234

00-00
000

NO. 2

VENDOR'S LEDGER

NAME: BUILDERS SUPPLY CO
ADDRESS: 1280 EVERGREEN
PHONE: _____

INVOICE DATE	REFERENCE NUMBER	JOB	OP	CL	INVOICES	DEDUCTIONS	TOTAL	DISCOUNT
915	11,001	1,108,008.00			151.20		527.65	26.38-
1026	11,218	1,201,006.00			376.45			

DATE	REFERENCE	DESCRIPTION	JOB	OPER	CL	DEBITS	CREDITS	PREVIOUS BALANCE	BALANCE
OCT 31 6-								1,251.75-	1,251.75X
OCT 13 6-	11,218	FV0	1,201,006.00				876.45-	1,251.75-	2,128.20X
OCT 18 6-	11,308		1,304,008.00			527.65+	315.20-	2,128.20-	2,443.40X
OCT 27 6-	1,234							2,443.40-	1,915.75X

CHECK NUMBER: 1,233

1,234

REMITTANCE VOUCHER
DETACH BEFORE DEPOSITING CHECK

NO 1234

PAYABLE AT .. BANK NAME _____

AUTHORIZED SIGNATURE _____

Fig. 14--Mechanized cash disbursements procedures.

JOURNAL

.00 *
.00 * B

OLD BALANCE	DATE	FOLIO	DEBITS	CREDITS	BALANCE	PROOF PICK-UP	PROOF
	10 MAY 6-	1,0 25	5 00.00	1 0.00	4 90.00 \$	8 04.00	4 90.00 *
		5 10 15 20 25 30					4 90.00 * B

Any Progressive Company
Anywhere

NAME Office Equipment Co. 804

OLD BALANCE	DATE	REFERENCE NO.	AMOUNT	DEDUCTIONS	BALANCE
1 20.00	3 MAY 6-	8 0 4	1 20.00		1 20.00 \$
2 00.00	5 MAY 6-	8 0 4	8 0.00		2 00.00 \$
	7 MAY 6-	8 0 4	3 00.00		5 00.00 \$

DETACH THIS STATEMENT BEFORE DEPOSITING CHECK DISCOUNT \$ 10%

Any Progressive Company
Anywhere

DATE	CHECK NO.	GROSS	DISCOUNT	AMOUNT OF CHECK
PAY 10 MAY 6-	1,0 25	5 00.00	1 0.00	4 90.00 \$

TO THE ORDER OF Office Equipment Co.
Any City

ANY NATIONAL BANK
ANY CITY

John Blue
AUTHORIZED SIGNATURE

⑆0960⑉0003⑆ 20⑉20⑉865⑆

Fig. 15--Mechanized cash disbursements procedures.

and the total of vouchered invoices is automatically accumulated for proof. The check writing is simple, fast, and accurate; and the net amount of every check is proved mechanically as it is posted. The total of all checks written is automatically accumulated for proof and the check register (journal) provides an easy means of bank reconciliation.

Purchases

Purchasing, accounts payable, and inventory control are closely related and all may be accomplished simultaneously with machine operations. The purchasing function is usually made up of the following activities: (1) purchasing, (2) receiving and inspecting, (3) storing, and (4) accounting.³

In most manufacturing concerns, a purchase requisition is prepared to indicate the type, the amount, and the time when purchases are required.

Upon receipt of the purchase requisition and determination of the best source of supply, the purchasing department prepares a formal purchase order specifying the quantity, description, prices if known, method of delivery, and date of delivery. The number of copies of the purchase order that are prepared varies with companies and the routine procedure followed. Usually a minimum of four copies are prepared to establish a certain amount of internal control. These four copies are used as follows:

- (1) One copy is sent to the vendor of the goods.
- (2) One copy is kept by the purchasing department.
- (3) One copy is sent to the receiving department, to check against the material when it is received.
- (4) One copy is sent to the department which requested the purchase, to inform them that the goods are on order.⁴

³Neuner and Neuner, p. 175.

⁴Ibid., p. 177.

Figure 14 showed the preparation of the accounts payable ledger card simultaneously with the check register and the voucher check.

Figure 16 shows the concurrent preparation of the vendor's ledger and purchase journal with columnar distribution. The vendor's account, the columnar journal, and a remittance advice, if desired, are posted simultaneously. Dates, account balances, and zero proof of every line of posting are printed automatically; and the total of all invoices is automatically accumulated for proof. The journal provides departmental distribution, or any other desired breakdown of purchases and expenses by product, material, or service; and simply totaling the distribution columns provides the necessary totals for posting the appropriate control accounts.

Figure 17 shows an example of machine-posted stock records. These records provide neat, accurate, and current information on receipts, issues, and balances; and all balances--both quantity and value--are extended automatically.

Sales

The use of mechanized accounting equipment makes possible the simultaneous production of the invoice, the customer statement, the accounts receivable ledger, the sales journal, the individual salesman reports, and the daily sales analysis summary.

PURCHASE JOURNAL

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.00 *
.00 *

DATE	NUMBER	DEBIT	CREDIT	BALANCE	OLD BALANCE	DEPT. 1	DEPT. 2	DEPT. 3	TAX	TRANS.	ACCT. NO.	GENERAL LEDGER	OO PROOF	OLD BALANCE
4 MAY 6-	1420	12050		62050	50000		10000	2050			509	1250	.00	50000
4 MAY 6-	915	1250		3750	2500								.00	2500
4 MAY 6-	2037	15000		29000	14000	7500		6500	120	1000			.00	14000
4 MAY 6-	890	4250		24250	20000		4130						.00	20000
		32550												

DATE	NUMBER	DEBIT	CREDIT	BALANCE	OLD BALANCE
16 APR 6-	547	6750		6750	6750
18 APR 6-	620	13000		19750	19750
23 APR 6-	178		6750	13000	19750
27 APR 6-	742	7000		20000	13000
4 MAY 6-	890	4250		24250	20000

NAME Acme Supply Company ADDRESS 215 W. Second Street Any City	SHEET NO. A RATING CREDIT LIMIT
--	---------------------------------------

Fig. 16--Mechanized Purchases Procedures.

STOCK RECORD

STOCK NO. A-1037 MAX. 180

DESCRIPTION Bearing - Acme MIN. 50

DATE	REFERENCE	QUANTITY		UNIT COST	VALUE	
		OLD BALANCE	NEW BALANCE		AMOUNT	NEW BALANCE
1 JUL 6-		80	80	2.00	160.00	160.00 *
3 JUL 6-	1,234	80	70		160.00	140.00 *
5 JUL 6-	506	70	170		140.00	357.00 *
10 JUL 6-	1,670	170	150		357.00	315.00 *

Fig. 17--Machine-posted stock records.

The production of these records also gives automatic: (1) invoice dates and consecutive numbers, (2) extension of product sales amount, (3) extension of product cost amount, (4) federal and state tax computations, (5) cash and trade discount computations, (6) computation of invoice totals, (7) customer account updating, and numerous cost, sales, and profit analysis figures.

Figure 18 shows the three records, invoice, inventory ledger, and accounts receivable ledger, that may be prepared simultaneously with automated accounting equipment.

Figure 19 shows the simultaneous preparation of the sales journal, the customer ledger card, and the statement. Dates, account balances, and line-by-line zero proof of postings are printed automatically; and amounts posted are automatically accumulated for proof. The journal provides departmental sales distribution, or any other desired breakdown by product, salesman, or service. Simply totaling the distribution columns provides the necessary totals for posting the appropriate distribution accounts.

Payrolls

There are numerous machines which can be used for payroll purposes. These machines will prepare at one writing, either through the use of carbon paper or of dual registers which repeat the recording on separate records, the payroll journal, the employees earnings record, the employees' pay statement, and the pay checks.

INVOICE
Burroughs Ⓢ

Sold To ACME DISTRIBUTORS, INC.
32451 MAIN STREET
ANYTOWN, U S A

Ship To SAME

DATE/INVOICE NO. JUL 6- 1,663
SLSMN./CUST. NO. 42 1,234
CUST. ORDER NO. TY45441
TERMS 2% 10/ NET 30
SHIP VIA ACME FRT.

QUANTITY			PRODUCT NO.	DESCRIPTION	PER	PRICE	AMOUNT
SHIPPED	ORDERED	BACK ORD.					
20	50	30	AF 126569	AF FILTER	EA	2.70	54.00*
25			AL321678	LOCK NUT	C	10.90	2.73*
75			GS444567	ULTRA SEAL	EA	.32	24.00*
10			TG678234	GASKET	EA	1.25	12.50*

DISCOUNT RATE/AM'T 2 1.86
SALES TAX RATE/AM'T 4 3.65
PLUS OTHER ADD-ON/CDE 10.50 105.52*

ACCOUNTS RECEIVABLE LEDGER

NAME ADDRESS CITY AND STATE	CURRENT	30 DAY	60 DAY	90 DAY	SLIP NO	CUSTOMER NO
	ACCOUNT BALANCE	SALES TO DATE	COST TO DATE			
ACME DISTRIBUTORS, INC. 32451 MAIN STREET ANYTOWN, U S A	116.00	30.00	10.00	20.67	4,200	1,234
		176.67	1,276.67	876.67		

DATE	REFERENCE	CHARGES	CREDITS	BALANCE	SALES TO DATE	COST TO DATE	MEMO
JUN 1-	1,657	137.81		314.88*	1,414.88	966.66	
JUN 4-	1,658	87.11		401.59*	1,501.59	1,025.29	
JUN 9-	234		137.81-	263.78*			
JUN 15-	123	14.50		278.28*	1,516.09		
JUN 16-	656		87.11-	191.17*			
JUL 3-	1,659	153.24		344.41*	1,669.33	1,300.08	
JUL 6-	1,663	105.52		449.93*	1,774.85	1,361.43	

INVENTORY LEDGER

PRODUCT NUMBER	DESCRIPTION	PRICING UNIT	SALES PRICE	FACTOR PRICE	COST PRICE	MIN REQ
16678234 235	GASKET 600	EA	1.25	1,250.00	780.00	550
						234

DATE	REFERENCE	ORDERED	ISSUED	RECEIVED	BACK ORD	ON ORDER	ON HAND	ON B/O	AVAILABLE
JUN 6-	1,660	12				600	338		938
JUN 8-	1,660	50				600	288		888
JUN 8-	1,660	45				600	243		843
JUN 9-	1,660	10			15	600	233	15	818
JUL 2-	1,662	15				600	218		818
JUL 6-	1,663	10				600	208		808

For CU E-154, 1022142
Used with 1018512
1022159
1022167

Fig. 18--Mechanized handling of sales.

SALES JOURNAL

.00 *
.00 *
.00 *

DATE	NUMBER	DEBIT	CREDIT	BALANCE	OLD BALANCE	DEPT. 1	DEPT. 2	DEPT. 3	TAX	FREIGHT	ACCT. NO.	GENERAL LEDGER	ODO PROOF	OLD BALANCE
27 MAY 6-	3.1 23	108.00		228.00	120.00	60.00	40.00	15.00	3.00	5.00	602		.00	120.00
29 MAY 6-	3.1 24	20.60		83.10	62.50		5.00		.60				.00	62.50
29 MAY 6-	215	90.00		19.00	10.00								.00	10.00
29 MAY 6-	3.1 26	51.50		194.00	142.50	30.00		20.00	1.50				.00	10.00
		189.10											.00	142.50

A

NAME Mr. Charles Gary
ADDRESS 105 Central Ave., Any City

SHEET NO. 1
RATING A
CREDIT LIMIT 500

DATE	NUMBER	DEBIT	CREDIT	BALANCE	OLD BALANCE
27 APR 6-	1.9 05	42.50		42.50	
10 MAY 6-	2.5 40	100.00		142.50	42.50
29 MAY 6-	3.1 26	51.50		194.00	142.50

STATEMENT

Any Progressive Company
Anywhere

Mr. Charles Gary
105 Central Ave.,
Any City

DATE	REFERENCE	CHARGES	CREDITS	BALANCE
10 MAY 6-	2.5 40	100.00		142.50
29 MAY 6-	3.1 26	51.50		194.00
			BALANCE FWD	42.50

Fig. 19--Mechanized handling of sales.

Figure 20 shows an example of the simultaneous preparation of all four essential payroll records. Gross pay, earnings to date (where included), dates, and net amount of checks are printed automatically; and the total of all checks is automatically accumulated for proof.

PAYROLL JOURNAL																																																																																														
NAME	EMP NO	PAY PERIOD	HOURS WORKED	EARNINGS				GROSS PAY	W. TAX	F.I.C.A.	DEDUCTIONS				DATE	CHECK NUMBER	AMOUNT OF CHECK																																																																													
				REGULAR	OVERTIME	OTHER					1	2	3	4																																																																																
Jane Baker	105	APR 24 63	4 2.00	60.00	4.50	2.00	66.50	5.10	1.33	.33	1.00	.50	3.00	APR 26 63	1234	532.48																																																																														
Stephen Fox	106	APR 24 63	4 0.00	72.00		3.00	75.00	11.70	1.50	.38	1.00	.50		APR 26 63	1235	60.42																																																																														
William Moore	107	APR 24 63	4 4.50	80.00	13.50	2.00	95.50	10.70	1.91	.48	1.00	.50	10.00	APR 26 63	1236	71.41																																																																														
EMPLOYEES EARNINGS RECORD NAME William Moore S. I. NO. 309-08-2336 EMPLOYEE NO 107 ADDRESS 290 Valley St. TAX CODE 3 PHONE NO. BR 1021 WAGE RATE 2.00 DATE OF BIRTH 5/8/25 DATE EMPLOYED 3/20/5-																																																																																														
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">PAY PERIOD</th> <th rowspan="2">HOURS WORKED</th> <th colspan="4">EARNINGS</th> <th rowspan="2">GROSS PAY</th> <th rowspan="2">W. TAX</th> <th rowspan="2">F.I.C.A.</th> <th colspan="4">DEDUCTIONS</th> </tr> <tr> <th>REGULAR</th> <th>OVERTIME</th> <th>OTHER</th> <th></th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>APR 5 63</td> <td>4 0.00</td> <td>80.00</td> <td></td> <td></td> <td>5.00</td> <td>85.00</td> <td>8.40</td> <td>1.70</td> <td>.43</td> <td>1.00</td> <td>.50</td> <td>10.00</td> </tr> <tr> <td>APR 12 63</td> <td>4 6.00</td> <td>80.00</td> <td>18.00</td> <td></td> <td>2.00</td> <td>100.00</td> <td>11.50</td> <td>2.00</td> <td>.50</td> <td>1.00</td> <td>.50</td> <td>10.00</td> </tr> <tr> <td>APR 19 63</td> <td>4 0.00</td> <td>80.00</td> <td></td> <td></td> <td>3.00</td> <td>83.00</td> <td>8.20</td> <td>1.66</td> <td>.42</td> <td>1.00</td> <td>.50</td> <td>10.00</td> </tr> <tr> <td>APR 26 63</td> <td>4 4.50</td> <td>80.00</td> <td>13.50</td> <td></td> <td>2.00</td> <td>95.50</td> <td>10.20</td> <td>1.91</td> <td>.48</td> <td>1.00</td> <td>.50</td> <td>10.00</td> </tr> </tbody> </table>																PAY PERIOD	HOURS WORKED	EARNINGS				GROSS PAY	W. TAX	F.I.C.A.	DEDUCTIONS				REGULAR	OVERTIME	OTHER		1	2	3	4	APR 5 63	4 0.00	80.00			5.00	85.00	8.40	1.70	.43	1.00	.50	10.00	APR 12 63	4 6.00	80.00	18.00		2.00	100.00	11.50	2.00	.50	1.00	.50	10.00	APR 19 63	4 0.00	80.00			3.00	83.00	8.20	1.66	.42	1.00	.50	10.00	APR 26 63	4 4.50	80.00	13.50		2.00	95.50	10.20	1.91	.48	1.00	.50	10.00						
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Fig. 20--Mechanical payroll preparation.

There are other types of equipment used in payroll accounting. Payroll charts or tables can be used to ascertain earnings and deductions without any computations, since all the computing work has already been done in the preparation of the table.

Payroll tax computer charts show withholding tax and the FICA (Social Security) deductions all on one line for weekly wage brackets. The tax computers may be obtained in a flat chart with a slide to move to the desired wage bracket, on a wheel that you rotate to the desired bracket, or with a magnifying knob controlled twirler. The variety of such tables is numerous. They can be ordered to fit almost any need, by state, payroll period used, method of deduction (withholding and Social Security separate or combined), etc.⁵

Summary Reports and Statements

The final, or ultimate, objective of all accounting work is first to record historically what has happened in the business and then to summarize this information in reports and statements for internal managerial use or for the use of the stockholders, banks, credit agencies, and public authorities.

Most companies issue too many reports. Up to ninety per cent of these reports are not used effectively and many are worthless. The criteria must lie then in the quality of the reports, in their timeliness, and in making them a part of a coordinated systems plan. The following essentials should be coordinated into a system of reports:

- (1) Each report should be brief and to the point.
- (2) Each report should be issued promptly and in a time sequence as required by the conditions of each management job.

⁵Neuner and Neuner, pp. 219-225.

- (3) Each report should tie in with an over-all systems plan. There should be a set of standards against which to measure results, the executive who receives the report should have the authority to redirect the activities covered, and it should form a part of a coordinated series of reports so that the performance of each executive can be reviewed at the next higher level.⁶

Mechanized accounting equipment may prepare these reports and statements as a direct by-product of preparing the original records or entries, or in a separate step or procedure.

For example, immediate sales analysis may be prepared as an automatic by-product of invoicing. Figure 21 shows an example of a monthly trial balance and age analysis of customers accounts completed as a by-product of transferring the customers' balances to new statements.

One of the most beneficial uses of machines for report preparation is in the completion of Schedule A of Form 941 and Form W-2 for the year-end wage reports to the government. The figures are picked up from the employee's earnings record only one time, and the machine automatically verifies the accuracy of the amounts recorded and automatically prepares the two year-end reports.

With machine accounting, a period year-to-date Profit and Loss Statement and current Balance Sheet are automatically prepared as a result of general ledger posting.

⁶Nelson and Woods, pp. 189-190.

TRIAL BALANCE AND AGE ANALYSIS					
NAME	BALANCE	90 DAYS	60 DAYS	30 DAYS	CURRENT
Adams, John C. 511 N. Main St.	200.00		50.00	30.00	120.00 *
Baker, Charles 131 Hillside Ave.	75.00	10.00	15.00	7.50	42.50 *
Carter, James B. 210 Market St.	150.00		25.00	50.00	75.00 *

STATEMENT				
Any Progressive Company Anywhere				
Mr. James B. Carter 210 Market St., City.				
OLD BALANCE	DATE	REFERENCE	CHARGES	BALANCE
				BALANCE FWD 150.00

Fig. 21--A monthly trial balance and age analysis.

Figure 22 shows several examples of the use of mechanized accounting equipment to prepare various summary reports and statements.

Regardless of the machines used or the reports or statements prepared, it must be emphasized that timely, detailed management reports can mean the difference between success and failure in any business; and the timeliness and effectiveness of reports and statements can be greatly increased through the use of automated accounting equipment.

SUMMARY REPORT (AUTOMATIC DISTRIBUTION PRINT-OUT)				
ACCOUNT NAME	CODE		TODAY	MONTH TO DATE
STEEL JOISTS	105 01		72.75	514.20
LONG SPAN JOISTS	02		.00	296.10
STRUCTURAL STEEL	03		.00	173.00
MISC IRON	04		.00	44.00
METAL FRAME DOORS	05		.00	93.00
METAL DOORS	06		40.00	110.20
FIRE DOORS	07		.00	75.60
KALEMEIN DOORS	08		.00	270.20
	09			

PROFIT AND LOSS (OPERATING STATEMENT)					
DATE	NO.	TOTAL FOR MONTH	TOTAL YEAR TO DATE	% TO GROSS SALES	
				MONTH	YEAR TO DATE
3 6 -	12.34				
440	GROSS SALES	10,500.00 CR	27,861.15 CR	100.00	100.00
441	RETURNS AND ALLOWANCES	355.00	535.00	3.38	1.92
442			.00		.00
443			.00		.00
444	NET SALES	10,145.00 CR	27,326.15 CR	96.62	98.08
545	INVENTORY	1,500.00			
546	PURCHASES	4,657.50			
547	PURCHASE DISCOUNT	134.09			
548	FREIGHT IN	254.70			
549					
550					
551	TOTAL COST OF SALES	6,278.11			

BALANCE SHEET			
DATE	NO.	NET CHANGE	BALANCE
3 6 -	12.34		
100	CASH	406.91	20,406.91
101	CASH ON HAND	50.00 CR	665.00
102	PETTY CASH	1.00	110.00
103	ACCOUNTS RECEIVABLE	3,329.99	7,329.99
104	RESERVE FOR BAD DEBTS	40.00 CR	120.00 CR
105	INVENTORY	1,500.00	11,500.00
109	PREPAID INSURANCE	20.00 CR	460.00
110	PREPAID INTEREST	18.23 CR	231.77

Fig. 22--Mechanized summary reports and statements.

CHAPTER VII

CONCLUSION

Manual accounting procedures can no longer meet the requirements placed on them by businesses today. The accounting machines of several years ago have been changed and improved to meet the changing requirements of the accounting systems of businesses today.

General office machines have become an important adjunct to computerized systems. The business machine manufacturers have produced new types of equipment and devices that speed individual operations and make them automatic and error proof. This is particularly significant for those companies not yet ready for large, highly integrated systems, but which must use automation to meet the demands placed on their accounting system.

In 1964-1965 a new class of automated computer-like business machines evolved, which reached upward from the traditional accounting machine applications into the area just below the small computer systems. This was particularly important to the small, but growing, companies which were not yet ready for the large computers but who had to mechanize to keep up with their overall growth. The diversity of these new automated machines allows the companies to

adjust their accounting requirements to the possible uses of the machines without having to purchase new machinery.

Regardless of the size of the company or the extent of mechanization within the company's accounting system, some of the benefits of mechanization are:

(1) Operating costs are reduced.

(2) Efficiency is increased.

(3) The work flow is smoother.

(4) Time is saved and accuracy increased.

(5) Neater, more informative records are provided.

(6) Employee morale is improved, and mental and physical fatigue is reduced.

(7) Machine systems are easy to audit, and examiners' fees are reduced.

(8) Simplified machine systems facilitate training.

Add these benefits to the numerous, diversified accounting equipment available today, and there is little excuse for a company to operate with anything less than a highly mobile, efficient, mechanized accounting system in today's business environment.

The simplest form of automated office equipment is the adding machine, the electric typewriter, and the numerous other small office machines available. The simplest type of accounting machine is an adding machine equipped with a movable carriage. The variety of accounting equipment available ranges from this simple adding machine to the relatively

new, and extremely flexible in application, direct accounting computer. Between these two extremes are numerous machines with varying applications and at various price ranges, depending on the applications desired.

The extent to which a company mechanizes its accounting system depends upon the size and requirements of the particular company and the desires of the company's management.

BIBLIOGRAPHY

Books

- Atkinson, Earl W. and Kenneth A. Romey. A Laboratory Manual in Business Machines. Dubuque, Iowa: Wm. C. Brown Company, 1953. 82 pp.
- Heckert, J. Brooks and Harry D. Kerrigan. Accounting Systems Design and Installation. New York: The Ronald Press Company, 1953. 663 pp.
- Johnson, Eldred A. Accounting Systems in Modern Business. New York: McGraw-Hill Book Company, Inc., 1959. 453 pp.
- Kohler, Eric L. A Dictionary for Accountants. New York: Prentice-Hall, Inc., 1952. 453 pp.
- Nelson, Oscar S. and Richard S. Woods. Accounting Systems and Data Processing. Cincinnati: South-Western Publishing Company, 1961. 643 pp.
- Neuner, John J. W. and Ulrich J. Neuner. Accounting Systems: Installation Methods and Procedures. Scranton, Pennsylvania: International Textbook Company, 1959. 577 pp.
- Oehler, Christian. Lawyers' Accounting Handbook. Albany, New York: Matthew Bender and Company, Inc., 1952. 915 pp.
- Paton, William A. (editor). Accountants' Handbook. Third Edition. New York: The Ronald Press Co., 1946. 1742 pp.
- Paton, William A. Essentials of Accounting. Revised Edition. New York: The MacMillan Company, 1949. 863 pp.
- Prentice-Hall Editorial Staff. Industrial Accountant's Encyclopedic Dictionary. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964. 595 pp.

Randall, Clarence B., Sally W. Weimer, and Maynard S. Greenfield. Systems and Procedures for Automated Accounting. Cincinnati, Ohio: South-Western Publishing Company, 1962. 616 pp.

Sutton, O. Machine Accounting. London, W. C. I.: Mac-Donald and Evan, Ltd., 1959. 278 pp.

The Editorial Board of Prentice-Hall Professional Accounting Publications. Vol. II, Accountant's Encyclopedia. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1962. pp. 457-871.

Articles

Barney, R. C. "To Mechanize or Not to Mechanize," Journal of Machine Accounting, Vol. 12, No. 9 (September, 1961), pp. 29-33.

Brady, Raymond. (editor). "Thirteenth Annual Office Report," Dun's Review and Modern Industry, Vol. 88, No. 3 (September, 1966), pp. 130-214.

Pollack, Sam D. "Business Machines Help Small Company 'Work Smarter'," Journal of Machine Accounting, Vol. 15, No. 12 (December, 1964), pp. 27-28.

Unpublished Materials

Eleosida, Gregorio T. "Organizing an I.B.M. Data Processing Center," Unpublished Master's Thesis in Accounting, Graduate School, Texas Technological College, 1962.

