

# MACHINE METHODS OF ACCOUNTING

## ACCOUNTING CONTROL

**T**HE development of accounting paralleled the growth of business. Just as the increased volume of manufacturing necessitated a larger number of factory workers, so the handling of a greater number of related accounting records necessitated an increase in the clerical staff.

As two people could not simultaneously record in a single journal, it was only logical that two or more books of original entry should be provided. It was also logical that accounting records should be kept according to the types of transactions to be recorded,—such as Sales, Purchases, Expenses, Cash, and Miscellaneous.

Posting of ledgers also had to be divided, and it was only natural that groups of related items which had numerous entries should be segregated into special ledger records. Since sales and purchases originally constituted the bulk of the business transactions, the personal ledger accounts of customers and vendors were first segregated to form the Accounts Receivable and Accounts Payable Subsidiary Ledgers. Later similar subsidiary ledgers were established for Property Records, Inventory, and Expenses.

This subdivision of accounting record-keeping into convenient working units gave rise to the problem of developing an effective means of control which would insure completeness and accuracy of all records. The problem was answered by the development of an adequate system of "Controls."

### Illustration of Accounting Control

The method of handling Accounts Receivable subsidiary ledger records will serve as an illustration of the method of controlling manual recording. The Subsidiary Ledger is a record separate and distinct from the General Ledger, to which data pertaining to individual transactions are posted from the Journal. After the separate personal ledger accounts for the customers have been removed from the General Ledger, a single account, called the Accounts Receivable Controlling Account, is created to take their places in the General Ledger.

Since the objective of this change was to reduce the number of entries to be made in the General Ledger, provision had to be made for transcribing the total amount of Accounts Re-

ceivable for a given period by a single posting. This is accomplished by providing a separate column in each Journal to facilitate the accumulation of the total to be posted.

Since the individual accounts in the subsidiary ledger are posted from the same Journals as the total posting to the General Ledger, the sum of the balances shown in the subsidiary ledger accounts should equal the balance in the General Ledger Controlling Account.

Sub-controls may be established which resemble in principle the controlling accounts of which they are sub-classifications. Accounts Receivable ledger accounts are frequently divided according to alphabetic groupings of customers' names, branch offices, geographic locations, or other similar divisions. This method facilitates the location of errors. When the detail ledgers are checked, the groups which balance to the sub-controls need not be analyzed. The repetition of the detail work for checking purposes is thereby limited to the sub-groups which do not balance.

For convenience, a *Control Sheet* may be drawn which will permit daily posting of amounts affecting each sub-classification.

Should any discrepancy appear between the totals of the balances in the detail records and the control, it would reveal that

1. A debit was posted as a credit, or vice versa.
2. A subsidiary ledger posting was omitted or duplicated.
3. The totals or new balances were computed incorrectly.

The control totals thus established can also be used to check the accuracy of any supplementary records which may be prepared for the assistance of management.

Although the balancing of the subsidiary ledger and control account does not necessarily insure complete accuracy of the records, since a posting may have been made to the wrong personal account, it does reveal errors of the three types just mentioned.

These errors, which at one time were located only by the detailed checking of each individual entry, are now detected in a much shorter time and with less effort through the localiza-



tion of errors by the use of the sub-controls previously described.

The maintenance of the Accounts Receivable control account is valuable not only to facilitate checking operations but also to reduce the labor involved in compiling "to-date" figures and statistics of the current period for management. It also facilitates the preparation of monthly closings by eliminating the necessity of re-summarizing the original detail items. A simple addition of the daily totals furnishes the required month-to-date figures.

### Accounting Control for Automatic Machines

The technique of accounting is almost entirely concerned with the arrangement and rearrangement of basic data to obtain summarized accounting and statistical figure-facts. This is the problem for the solution of which tabulating machines were originally designed and developed, and to which they have long been adapted with outstanding success.

Without any further discussion at this time concerning the development of accounting technique, it is evident that all procedures not using punched cards start with the fundamental problem of making many postings for each transaction; since they do not provide any method of *automatically* classifying and reclassifying the accounting data to be analyzed. Some postings may be eliminated by grouping similar items in special books or special columns of those books; but there is a continuous effort exerted, with only limited success, to reduce further the repeated transcription of the same entry to various intermediate records.

The punched card method is unique among the various accounting procedures because it prepares finished reports automatically from the punched and verified unit tabulating card records. As a direct result, errors which are characteristic of manual routines are eliminated.

#### The Control Sheet

Although this method supersedes and eliminates all the intermediate written records such as multiple-column journals and manually-posted ledgers, the system of control accounts is preserved in the machine accounting procedure. The form of the "Control Sheet" varies with each business and each phase of the accounting work; but, as a general rule, when a large number of entries are entailed it should provide for the recording of daily totals for

#### Significance of Accounting Control

From the illustration of the use of accounting controls just given, it should be possible to appreciate the value of such control records in all branches of a functionalized accounting department. These records are equally applicable to all the subsidiary ledger records and analyses in order to insure accurate transcription and accumulation of amounts, to simplify the location of errors, and to facilitate the compilation of to-date and month-end figures.

the same classifications that would have appeared as special column headings had a purely manual routine been developed.

The control may be expanded, if desired, to include quantity totals to supplement the dollar value controls just described.

#### Determination of Control Totals

Various clerical divisions analyze the same original data from different angles. Sales records, as original documents, appear in the Billing, Accounts Receivable, Sales Analysis, Accounting, and Finished Stock departments. Therefore, the selection of a department which is to determine the amount to be posted to the Control Sheet should be considered in setting up the control routine. Independent controls in each department would result in unnecessary confusion rather than in a simplified routine. It is customary, therefore, to set up a Billing Control to which each of the other departments must make their records conform. This control is created as a by-product of the billing operation at the time the copies of the invoice which will constitute the Sales Journal are prepared.

Whenever possible, the controls should be set up by the individual responsible for the preparation of the basic accounting documents, as illustrated in the setting up of controls for Sales. Memoranda of the totals should accompany each batch of original documents to the offices responsible for the maintenance of the Control Sheet.

#### A Typical Routine

Documents which are received in the tabulating department should be accompanied by an adding machine tape or other convenient memorandum of the control total for each batch of records. This amount is recorded by the

### RECAPITULATION OF AGENCY BILLING

AGENCY Boston DATE June 1 1936

PAGE \_\_\_\_\_ TO \_\_\_\_\_

This agency control sheet is to be prepared in DUPLICATE. The ORIGINAL is to be attached to each group of Invoice Copies when transmitted to the Home Office.

The DUPLICATE is to be retained at the Agency to facilitate preparation of TRIAL BALANCE RECONCILIATION (Form R1683) at the end of the month.

OFFICE CODE NO.		COST	BILLED
15-021	15-422	SUPPLIES AMOUNT BILLED	4735.69
15-423	15-031	COST OF SUPPLIES	2925.80
15-022	15-426	SERVICE AMOUNT BILLED	795.18
15-517	15-032	COST OF PARTS USED	690.00
15-024	15-456	I S SERVICE BILLED	495.15
15-518	15-033	COST OF I S PARTS	380.00
15-023	15-436	BILLED FOR INSPECTIONS ACTUALLY MADE	
<b>TOTAL</b>		<b>3995.80</b>	<b>6026.02</b>

*Billing Control Memorandum*

supervisor on the Control Sheet. After the tabulating cards have been punched, they are retained temporarily in groups corresponding to the batches of documents from which the data were transcribed.

The cards are then tabulated to obtain the totals, which should balance with the control sheet. Either the machine totals may be checked directly to the controls, or the tabulating machine operator may prepare a memorandum record of the machine total, which is forwarded to the supervisor for checking. It is essential that a capable, responsible person be assigned to the task of maintaining control records and checking the accuracy of the punched cards and reports.

If the cards balance to the Control Record, they are released for current analysis or filing. If they do not balance, the error must be located by one of the methods discussed later under Verification. In many cases, errors may have been made in setting up the original control totals. This would necessitate communicating the information concerning adjustments to be made to the person responsible for the preparation of the original record. Any punching corrections which are made should be carefully checked and proved before releasing the batch of cards.

The totals of amounts appearing in cards which have been balanced to the control totals and filed, when tabulated at the end of the

BILLING CONTROL SHEET								
DATE	BOSTON		NEW YORK		CHICAGO		SAN FRANCISCO	
	BILLED	COST	BILLED	COST	BILLED	COST	BILLED	COST
<i>June 1, 1936</i>	6026.02	3995.80						

*Billing Control Sheet*

FACTORY PAYROLL - CONTROL SHEET

DATE	DIRECT		INDIRECT		TOTAL	
	HOURS	AMOUNT	HOURS	AMOUNT	HOURS	AMOUNT

MATERIAL AND SUPPLIES CONTROL

MONTH OF

LOT NO.	INVOICE	FREIGHT	EXPRESS	TOTAL VOUCHER	RAW MATERIALS	STORES	PURCHASED PARTS	MISC.

STORES INVENTORY ENTRY CONTROL

DATE	LOT	OILS & GREASES		ABRASIVES		SMALL TOOLS		PACK. MAT'L		FUEL		OTHERS		TOTAL	
		REC'D	DISB.	REC'D	DISB.	REC'D	DISB.	REC'D	DISB.	REC'D	DISB.	REC'D	DISB.	REC'D	DISB.

DIRECT LABOR - DEPARTMENTAL CONTROL

DATE	DEPT. A	DEPT. B	DEPT. C	DEPT. D	DEPT. E	TOTAL

month or other accounting period, should be in agreement with the totals posted to the control sheet. Should any discrepancy appear, the error may be located by sorting the cards according to sub-control accounts and dates of entry in order to determine the small group of cards in which the difference appears.

### General

One of the important advantages of the punched card method is the simplicity with which errors may be localized to reduce detail checking routines through the proper use of controlling accounts in conjunction with automatic sorting and accounting machines.

Other factors, in the form of verifying methods that insure the accuracy of transcription of details, contribute to the accuracy of the method. The controlling accounts can not be eliminated, however, through the substitution of these other checking and verifying systems. The control sheet furnishes a check which no other system can adequately perform—that is, it establishes positively that all of the transactions have actually been included in the analyses and reports.

The line of demarcation between verification of details and balancing to controls must be clearly established to appreciate fully the part played by each in assuring accuracy of results.

## Verification

Current methods of verification had their origin in the early development of accounting principles, as did the machine accounting controls that have already been described. The first principles of bookkeeping followed the basic principles of mathematics, as evidenced by the fact that the first printed reference to the subject of modern business record-keeping, published during the 15th century, was made in a mathematical text. The description covered the method of handling increases and decreases affecting balance sheet accounts which constitute the Equation of Business—

$$\text{Assets} = \text{Liabilities} + \text{Net Worth}$$

It was only logical to develop a system of checking for bookkeeping that would correspond to the checking methods for the science of mathematics. Originally, repetition of the work or reversal of the operations (add to subtract, multiply to divide, and vice versa) became the standard systems of verification of accuracy. Bookkeeping routines underwent various changes as adding machines, typewriters, and automatic accounting machines were introduced. Verification principles also had to be modified to conform with general practices governing the use of machines.

In the punched card method of accounting the term "verification" is usually limited to the proving of the accuracy of the punching of the card. Because of the important part played by the tabulating card, its accuracy should be established as early as possible by some accepted system of verification. Assurance of accuracy in the transcription to tabulating cards of accounting and statistical data may be established by various verifying routines—depending upon the kind and extent of veri-

fication required. As a general rule, all tabulating cards should be verified which are to serve as accounting media for use in the preparation of records having destinations outside of the business, which are to be used as a basis of payment and collection of money, or which are to be used in the calculation of profits.

### Factors in a Good System of Verification

The system of detail verification which is used must comply with a few basic principles that generally govern this type of work such as:

1. Proof that all entries have been verified should be set up to furnish assurance that every entry has actually been proven. Unless this is done there is a tendency to neglect part of the verifying routine during the peak-load periods, nullifying the effective checking that has been done up to that time.
2. Any errors that exist should be revealed in one checking operation. Successive re-checking operations to locate errors which were not observed in previous checking are expensive.
3. Documents to be checked should be in such sequence that when an error is located, cross-reference to other records should be possible in a minimum amount of time.
4. Adequate provision must be made to insure accuracy in the making of corrections. Any changes in the card or control totals should be carefully made.
5. The entire operating routine should be so organized that responsibility for errors may be located and analyzed.

### Methods of Verifying

The punched card method has only one manual transcription of data, and consequently only one verifying operation is required. This operation usually is performed, immediately after the cards have been punched, by mechanical key-verification.

The theory of mechanical verification is identical with that of any checking procedure—that repetition of work by a different person reveals any errors which may have been made by the person who originally performed the task. Such a method of verification is essentially a comparison of the original data with

those recorded on the punched cards. Key verification reduces the human element hazard in the checking procedure and gives definite assurance that the punched hole records are correct. It can be effected at a speed equal to or greater than that of the normal punching operation.

A few methods, including the use of the key-driven verifier, which have been used in some applications and found useful for verifying all or any portions of the cards are briefly described below. The methods of checking enumerated may be used individually or in combination.

1. Use of mechanical or motor-drive verifier for verifying all or any part of the card.
2. Reading punched holes back to the original data.
3. Interpreting (printing on the top edge of the card the numerical punching appearing in each column) and reading back to original data.
4. Punching with alphabetic printing punch and reading back.
5. Preparing a printed list on the tabulator and reading back.
6. Sight- or needle-checking common data.
7. Parallel-balancing amounts in total cards and detail cards.
8. Zero-balancing by subtracting amounts in total cards from amounts in detail cards, or vice versa, to secure a zero balance.
9. Punching two fields with same data so that the two separate fields can be tabulated for a balance.
10. Punching two sets of cards so that each card of one set may be superimposed and sight-checked on the corresponding card of the other set.
11. Balancing to predetermined totals.
12. Listing and comparing related information.
13. Automatic controlling related information.
14. Automatic controlling common data in successive cards.
15. Sorting and fanning dual cards.
16. Sight-checking reports for consistency or reasonableness.
17. Use of checking features on the multiplying punch.
18. Use of the comparing reproducer.
19. Use of the automatic checking machine.
20. Use of the missing-number device or automatic control of consecutive numbers.

### Unverified Data

The cost of attaining complete accuracy of all punched data constitutes a factor that must be given considerable attention, as detail verification necessitates a repetition of the work previously performed. Just as the elimination of non-essential operations in manufacturing reduces costs, so the reduction of the amount of verification will result in accounting economies. The decision with regard to the extent of verification should be based on an analysis of subsequent uses of the cards and the nature of the documents and reports to be prepared on the accounting machine.

It is not necessary to verify cards that will be used in the preparation of purely statistical analyses. The reason for eliminating the verification of statistical records is not because of an indifference toward accuracy, but because the cost of verification can seldom be compensated for by the value of the increased accuracy. It must be remembered in this connection that the errors which occur in punching are far less numerous than the errors which may have been introduced in the preparation of the original document. Many of the errors may be due to illegible records, improper classification, omission of data, and other causes, which could not be detected by verifying the punching.

A relatively high degree of accuracy may be obtained in those cases where detail verification is not performed, by balancing to predetermined value or quantity totals and checking the final tabulated report for reasonableness of amounts for each classification.

Verification of the punching of tabulated cards is not essential when:

1. Possible errors in the preparation of the document of classification have not been checked.
2. The cost will not be offset by the value of the results obtained.
3. Subsequent spot-checking will furnish reports of sufficient accuracy.
4. Operators have developed sufficient aptitude to locate errors by more economical checking methods.
5. Dual cards are used. These may be sight-checked for the accuracy of the punching of classification data before each tabulation. The visual check is made by fanning through the cards after they have been sorted and ascertaining that the written classification is the same for each group.