

# MACHINE METHODS OF ACCOUNTING

## THE PREPARATION AND USE OF CODES

**N**UMERICAL codes have long been recognized as the most concise and accurate method of identifying individual items and groups of related items. Their advantages are especially obvious when observed in connection with the sorting and classifying operations of accounting machine systems.

The proper designing of codes is therefore an inherent part of every installation of International Electric Accounting Machines, and is of paramount importance in determining the most efficient preparation of the required reports and tabulations.

This section has been prepared for the purpose of presenting:

1. The various principles and methods of code preparation with their attendant advantages and disadvantages.
2. Some representative examples of coding in actual use.
3. Methods of automatic coding.
4. Simplified methods of decoding final reports.

Careful review of these factors will facilitate the proper selection and design of codes to meet any specific need.

### Coding Principles

#### Sequence Codes

The simplest form of coding that can be utilized is the sequence method. It consists of the simple assignment of numbers, starting with 1, to a list of items arranged in any order. An example follows:

No.	Salesman	No.	Salesman
1	George Adams	7	Ernest Eton
2	John Beldon	8	Charles Franklyn
3	Arthur Brown	9	Louis Gordon
4	John Calahan	10	John Hamilton
5	Thomas Dalton	11	Richard Mason
6	William Elkton		etc.

The sequence method does not provide for any classifying of groups and can not be used where such requirements exist. It provides the best and only practical plan for coding lists of not more than twenty or thirty items, or for numbering longer lists where there is absolute assurance that no classification will ever be needed.

A sequence code always requires memorization or decoding, therefore the original list to be numbered should be arranged in some logical order to aid in this process. The code illustrated has been arranged in alphabetic order of last name.

New names or items are assigned to the next higher number, therefore the order of the original list will not be maintained indefinitely unless the list is fixed in character. If it is desired to maintain a definite arrangement, the original list may be assigned to every second, third, or fourth number, and new items inserted

in their proper place in the arrangement. Generally speaking, a sequence code would not be employed where arrangement is a vital factor.

The sequence method of coding, due to its simplicity and unlimited expansion, has been mistakenly applied again and again to long lists of items or names, with the result that there can be no quick grouping by any classification, and reference must be made to group lists. This is particularly handicapping to tabulating machine operation. When such a condition is encountered, a new scientifically constructed code must be designed along the lines set forth later in this section of this manual.

The sequence plan of coding has a vital function in connection with most of the more comprehensive methods of coding, inasmuch as subdivisions of larger groups are usually coded in sequence. This principle can be employed to advantage in some machine installations where a combination of article numbers, descriptive codes, and dimensions is used for identifying individual items. In these cases the use of ordinary coding principles results in a great many digits. For example:

1839	—32	14" x 18"—11
(Mirror)	(Walnut)	(Size) (Bevel Edge)
1839	—32	14" x 20"—12
(Mirror)	(Walnut)	(Size) (Square Edge)
1839	—35	14" x 18"—11
(Mirror)	(Mahogany)	(Size) (Bevel Edge)
1839	—35	14" x 18"—12
(Mirror)	(Mahogany)	(Size) (Square Edge)

Twelve digits are required here because fin-

ishes and edges are coded according to a standard code for all articles, and because sizes have been used directly. The result is beyond the best efficiency of the machines for sorting and automatic controlling. Decoding requires reference to two code lists, one for finish and one for edge.

The same conditions can be met by the following sequence coding of subdivisions:

1839	Mirror—Item	1
1839	“ — “	2
1839	“ — “	3
1839	“ — “	4

Thus one digit replaces eight, and decoding can be done at one operation instead of two. The gain in machine time and capacity is considerable, and no attempt need be made to use the code for other than the internal operation of the machine department. The regular code may be used otherwise and may be punched in the cards in addition to the sequence number, if desired.

In this manner sequence coding may be used to avoid the disadvantages of an over-coding situation, and in some cases will provide a quicker identification than a complicated, though scientifically constructed, code.

### Block Codes

This term is applied to codes which utilize groups or blocks of numbers in sequence to represent classifications. These blocks are not arranged according to tens, hundreds, or thousands, but according to any desired number of units. An example follows:

1	Razor Blades—packed	10	} 1—5 Blades
2	“ “ — “	12	
3	“ “ — “	50	
4			
5			
6	Hoe Type Razor—Gold	} 6—12 Hoe Type	
7	“ “ “ —Silver		
8	“ “ “ —Nickel		
9	“ “ “ —Style H		
10	“ “ “ —Style K		
11			
12			
13	Straight Razor—Black	} 13—16 Straight	
14	“ “ —Ivory		
15			
16			
	etc.		

Block coding provides a method of coding by

classes where the number of digits must be limited, as it provides more groups with less digits than any other class coding plan. Expansion is also provided in a limited way by the reserving of vacant numbers in each group.

The above principle can be brought out by a simple analysis of the illustrated code. Three groups with their individual items have been covered in the first 16 numbers, therefore eighteen similar groups could be handled in the first two digits, or 99 numbers. In an ordinary group coding of the same items, it would be necessary to allow two digits to indicate the groups, and a third digit would be required for the individual items under the groups. Thus the block code has taken one digit less than the corresponding group code.

Block coding reduces machine sorting, but will not automatically control in the tabulator. Card groups must be separated by hand, and tabulated group totals can be obtained only by separate clearing of the machine. Therefore, block coding should be used only where there is a restriction on the number of digits or where sorting of the cards is a large factor, and then only for short lists.

Block coding as a principle also has a function in combination with other codes for the designating of subdivisions and the signalling of special information. For example, in the following code of operating accounts, the numbers of the subdivisions of each account have been assigned according to the block principle.

### 10 Receiving Labor

1	Supervision	} 1—3 Indirect
2	Cleaning and Janitor	
3	Other Labor	

4	Trucking	} 4—9 Direct
5	Receiving	
6	Stacking	
7	Sorting	
8	Viners	

### 11 Preparation Labor

1	Supervision	} 1—3 Indirect
2	Cleaning and Janitor	
3	Other Labor	

4	Serving Cutters	} 4—9 Direct
5	Cutting and Sorting	
6	Lye Peeler and Blancher	
7	Sorting Belt Work	
8	Grading	
9	Slicing	

This arrangement permits the machine sorting and tabulating of two groups for each major account, the cards being easily separated at the uniform dividing line between "3" and "4". The tabulator will not make this separation automatically, nor will it print any sub-group indication.

### Group Classification Codes

Group classification codes are those codes in which major and minor classifications are represented by the succeeding digits of the numbers, and are the most efficient for ordinary coding problems. An example follows:

#### 1000 Materials

##### 1100 Production Materials

##### 1110 Brass

1111 Strips  
1112 Sheets  
1113 Bars  
1114 Castings  
1115 Tubing

##### 1120 Steel

1121 Plates  
1122 Strips  
1123 Wire  
1124 Bars  
etc.

In the above code all digits except the last represent a definite classification in such a way that a machine sort on the particular digit representing any desired classification will accomplish a complete separation. The automatic control feature of the tabulator can be used throughout, and sorting is required only as far as the digit which represents the groups or controls needed for any given report.

When constructing a group code, it is well to start each subdivision with the numeral "1" rather than "0", leaving the latter open to indicate the groups. In the sample code, for example, the first detail item is No. 1111 and no use is made of the numbers 1000 to 1110 other than to indicate the groups. If this wasting of 110 numbers in each major group is not desirable from a capacity standpoint, they may be assigned completely or partially as follows:

#### 1000 —Materials—Production—Brass

1001 Strips  
1002 Sheets  
1003 Bars  
1004 Castings  
1005 Tubing

#### 1010 —Materials—Production—Steel

1011 Plates  
1012 Strips  
1013 Wire  
1014 Bars  
etc.

This arrangement does not affect the efficiency of the code or of machine operations.

It only tends to consolidate the names and numerical designations of the groups.

In many cases it will be found that there will be more than nine or ten individual items to a group, thus breaking the ideal arrangement of the code. When this occurs two sets of numbers may be consolidated into one group as follows:

#### 10 — Roadside and Grade

11 — Earth Work and Embankments  
12 — Earth Shoulders  
13 — Metal Shoulders

#### 20 & 30 — Drainage Structures

21 — Bridges 100' span or more  
22 — Bridges under 100' span  
23 — Culverts  
24 — Curb and Gutter  
25 — Catch Basins  
26 — Ditches  
27 — Spillways  
28 — Tile Lines  
29 — Baffle Walls and Weirs  
30 — Stream Channels  
31 — Intakes

#### 40 — Grade Separations

41 — Viaducts over Railroads  
42 — Viaducts over Highways  
43 — Subways under Railroads  
44 — Subways under Highways

This arrangement will break control on the tabulator, but a simple manual addition of the two resulting totals will give the desired result, and is usually better than adding a digit to the code to take care of exceptional groups.

Another good example of this type of code is available in booklet form under the heading of "Numerical Code for States, Counties and Cities of the U. S." Here the major divisions represent states, and the subdivisions represent cities arranged in alphabetical order.

Since this code is used primarily in designating the customers of a business concern, a third subdivision is added in practice, namely, customer. Customers are numbered by cities, thus giving a three-division group classification code.

Since group classifications codes are so easily constructed and so popular, they are often applied where there is no use for them. Where automatic tabulation and recognition of definite groups is not a vital factor, a sequence code or block code will usually accomplish the purpose with less digits, less sorting, and fewer card columns.

**Significant Digit Codes**

This term has been applied to codes wherein all or some of the digits represent weight, dimension, distance, capacity, or any other factor which has been transferred bodily into the code. In one sense this is not actual coding, as these factors determine the numbers without coding.

The primary object of significant digit codes is to eliminate or reduce the work of decoding by providing a code number that is directly readable. A secondary object is the provision of a means of expansion according to the schedule predetermined by the factor included in the code. An example follows:

Code Number	R. R. Station Name	
010	Leeds	Mo.
013	Edgecomb	"
015	Swope Park	"
017	Dodson	"
019	Holmes	"
058	Abbott	Okla.
116	Cleveland	Mo.
275	West Line	"
375	Acorn	Ark.

The number representing the name of the station in this case is determined by its distance in miles from a starting point.

The following five-digit code explains how this principle of coding may be applied to various articles. In the examples, the first two columns are for group classification only. The balance of the columns are devoted to unit classification in which the significant digit code is illustrated.

In this first example the code numbers are expressed in inches, and correspond to the length of the files.

10000 — Files	
10004	— 4" files
10005	— 5" "
10006	— 6" "
10012	— 12" "
10015	— 15" "
10018	— 18" "

In the following instance the code numbers correspond to the size of the bulbs expressed in watts.

13000 — Bulbs, Electric Light	
13020	— 20 Watt Bulbs
13025	— 25 " "
13040	— 40 " "
13060	— 60 " "
13100	— 100 " "
13200	— 200 " "
13250	— 250 " "

The hundreds column below is used in indicating the width of the chisels in inches. The tens and units columns indicate less than one inch expressed in sixty-fourths of an inch, which is the common denominator of the fractions.

11000 — Wood Chisels	
11008	— 1/8" Chisel
11016	— 1/4" "
11024	— 3/8" "
11032	— 1/2" "
11140	— 15/8" "
11148	— 13/4" "
11200	— 2" "
11256	— 27/8" "

Here the code numbers for the diameter are placed in the hundreds column expressed in thirty-seconds of an inch, the tens column gives the length of the pins in inches, and the unit column shows the fractional lengths in eighths of an inch.

12000 — Pins, Cotter	
12310	— 3/32" diameter by 1" lgth pins
12314	— 3/32" " " 1 1/2" " "
12410	— 1/8" " " 1" " "
12412	— 1/8" " " 1 1/4" " "
12414	— 1/8" " " 1 1/2" " "

The following code gives directly the weight of the contents each kind of sack is designed to hold.

14000 — Sacks, Cotton	
14025	— 25 lb. sacks
14028	— 28 " "
14035	— 35 " "
14050	— 50 " "
14056	— 56 " "
14070	— 70 " "
14100	— 100 " "
14140	— 140 " "

In this case the containers are reduced and expressed in gills as the common denominator.

15000 — Containers	
15001	— 1/4 pint container
15002	— 1/2 " "
15004	— 1 " "
15005	— 1 1/4 " "
15006	— 1 1/2 " "
15007	— 1 3/4 " "
15008	— 1 quart "
15016	— 1/2 gal. "
15032	— 1 " "

Prunes and other fruits are often classified according to the count or number to the pound.

Any one of the following codes may therefore be selected to indicate this count directly.

38000 — Prunes	3800-Prunes	38000-Prunes	
38020 — 20-30 count	} (or) 3823 } (or)	38203	
38030 — 30-40 “		3834	38304
38040 — 40-50 “		3845	38405
38050 — 50-60 “		3856	38506
38060 — 60-70 “		3867	38607
38070 — 70-80 “	3878	38708	

Codes similar to the examples given might be continued indefinitely. The principle can be applied to any products and items which are identified by units, measures, or numbers, provided these factors are not too lengthy to convert into practical codes. Although most of the examples given in this section are five-digit codes, it is not essential that five digits be used in a significant digit code. Such a code may be applied to any number of digits. This of course depends entirely on the particular requirements of the problem.

The significant digits need not always be determined by units, measures, or factors of like character, but may be in themselves code numbers. Thus in designing a new code to replace one already in existence, it may be found advantageous to have the new code numbers arranged so that they reproduce or partially indicate the old, thus—

4000 — Pumps	
4017 —	#17 Pump
4024 —	#24 “
4077 —	#77 “
4812 —	#812 “
4997 —	#13997 “

The old code numbers or identification numbers often have been well memorized, and therefore should be preserved for their significant value. This applies also to the conversion of mnemonic symbols into straight numerical codes, where as much of the original symbol should be retained in the new code as can be accomplished without increasing the number of digits.

In using the significant digit method of coding it will sometimes be found that actual dimensions may be used directly without a code, provided the number of digits is not too great for sorting. Thus tire sizes are often used directly without any code other than for indicating general groups.

#### Final Digit Codes

This term is applied to the use of ending or final numbers to designate certain information in regard to the items so coded. It is used only in connection with some other type of code and is not a complete code in itself.

The use of a final digit code is warranted only when the information to be brought out has no relation to the classifications of the main or primary code.

The simplest and most common application of the final digit principle is the assigning of numbers ending in “0” to indicate items of special importance. The telephone companies utilized this principle in assigning phone numbers ending in “0” or “00” to subscribers having large private switchboards, thus signaling their operators to try more than one line.

Another simple device under this method is to assign all of the items of one class to numbers ending in even numerals and all of a second class to those ending in odd numerals. This accommodates two kinds of items and presupposes that they will be about evenly divided. Where there are more classes and where they are unevenly divided, the following may be employed:

#### Final Digit

- 1 — Manufactured Products
- 2 — Purchased Products
- 3 — Assembled Products

(or)

#### Final Digit

- 1, 2, 3, 4 — Manufactured Products
- 5, 6 — Purchased Products
- 7, 8, 9 — Assembled Products

The second arrangement makes more numbers available for each group, and while not suited for automatic controlling on the tabulator does lend itself easily to a manual separation of cards. The first arrangement may be expanded to indicate ten classes by use of all of the ending numerals.

One of the most frequent uses of a final digit code of the first arrangement is the assignment of the ending numeral “9” to indicate “Miscellaneous” at the end of a block of names, accounts, or items.

400 Expense	405 Research
401 Rent	406 Advertising
402 Traveling	407
403 Automobile	408
404 Office	409 Miscellaneous

Where more capacity is desired, with only one numeral or column required for sorting, the second ending digit may be used as the significant numeral instead of the first, as follows:

- 10 — Class 1
- 20 — Class 2
- 30 — Class 3

(or)

10, 20, 30, 40 — Class 1  
 50, 60 — Class 2  
 70, 80, 90 — Class 3

The disadvantage of this method is that it may begin to interfere with the main code unless there is a large number of digits. It must be remembered that the use of final digit designations always tends to reduce the capacity of the main code, due to the fact that certain numbers must be reserved for their proper items, and are thus not available for all new items. The second method shown in both cases above is based on the frequency of occurrence of the classes, and therefore reduces the main code capacity to the least extent.

The use of fractions, letters, or symbols at the end of a code number to designate special items must not be confused with final digit coding, as these devices are simply equivalent to the addition of another digit to the main code. A true final digit code adds one or more classifications to the main code without the addition of any digits. It simply governs the way the regular code numbers shall be assigned.

Where final digit codes are employed, a tabulation of the items so coded can usually be made directly following the first or initial sort of the cards for the main or primary report. Thus no extra sorting is required.

### Decimal Codes

The decimal system of coding was developed primarily for the purpose of indexing in library work, and for classifying correspondence according to subject. One of these codes is reproduced in part below:

000 General  
 100 Philosophy  
 200 Religion  
 300 Sociology  
 400 Philology  
 500 Natural Science  
   510 Mathematics  
   520 Astronomy  
   530 Physics  
   531 Mechanics  
   531.1 Machines  
   531.11 Lever and Balance  
   531.12 Wheel and Axle  
   531.13 Cord and Catenary  
   531.14 Pulley, simple  
   531.141 Pulley, compound  
   531.15  
       etc.

It will be noted that the coding to the left of the decimal point is the same as the regular group classification method. It is only in the finer subdivisions that the decimal principle comes into play. This type of coding is not so well adapted to the identifying of individual items or articles as it is to the designation of groups, accounts, or subjects.

A decimal code is capable of unlimited expansion, since any number of new subdivisions can be inserted and designated by additional decimal places. This is accomplished, however, at the expense of a greater number of digits. In the illustration, "531.141—Pulley, compound," has been inserted as a subdivision of "531.14—Pulley."

The decimal system of designation has been used by many cities and municipalities for numbering lots on city maps. It is one of the best methods for this purpose, as it allows lots to be subdivided again and again, and a number is still available for each parcel of land.

The advantage of the decimal system, namely its unlimited expansion, is a disadvantage for tabulating machine usage, as card design and other requirements are not adapted to a changing number of digits. In designing a card to be used with a decimal code, one or two additional columns should be reserved to the right of the decimal to provide for any new classifications which may later appear.

In most cases an attempt should be made to convert the decimal code to a fixed digit code which provides expansion by means of vacant numbers. The illustrated code converted to a regular group code would appear as follows:

531000 Mechanics  
   531100 Machines  
     531101 —  
     531102 —  
     531103 Lever and Balance  
     531104 —  
     531105 —  
     531106 Wheel and Axle  
     531107 —  
     531108 —  
     531109 Cord and Catenary  
     531110 —  
     531111 —  
     531112 Pulley, simple  
     531113 Pulley, compound  
     531114 —

In the above example the code has been definitely limited to six digits, with allowance for considerable expansion, whereas there is no assurance that the corresponding six-digit deci-

mal code would not eventually be carried to seven or eight digits. In making such a conversion it is often found that one digit may be immediately dropped from the decimal code, particularly where there are only a few subdivisions utilizing the last decimal place.

### Mnemonic Symbols

This term is used to designate codes which have, as an integral part of their construction, some aid to the memory expressed in letters, numbers, or combinations. For example, the following is a common type of mnemonic symbol.

H 2 B W 1 2 1/2

This might represent a 2 pound Hammer with Ball peen and 1 1/2 inch Wood handle, the initial letters and dimensions being used to determine the symbol.

It is obvious that this principle can not be employed indefinitely, due to the conflict of names beginning with the same letter. Should it be desired to designate Hack Saw, for instance, in the same code it is likely that "S" would be used, or "HK."

In other cases it is customary to employ letters with similar sounds to accomplish the purpose, and there are no definite rules except that an effort is made to select a symbol which suggests in some manner the item it represents. The letters I, O and Q must not be used, due to their similarity to the numerals 1 and 0.

Symbols which ordinarily do not accomplish this purpose may in some cases be considered mnemonic if the symbol itself has become familiar. Thus "R" may be used to designate supply items because the Supply Department has been known as Department "R."

The sequence and position of the letters and figures constituting a symbol have a significance, and in this respect resemble a decimal system of coding. This sequence should be arranged so that the letters of the alphabet are intermingled with the figures, as such a symbol is more easily remembered than one with all letters together and all numerals together, since the classifications are better accented.

An example of mnemonic coding may be found in the method of assigning automobile license numbers in certain states. Although these numbers are not code numbers in the strict sense, the mnemonic principle is used, inasmuch as the letters of the license are made to correspond to the initial of the county in which they are issued.

The disadvantage of a mnemonic symbol is that it is always growing in length. Whenever there is a split in classification, a new digit or numeral is added. It also has the disadvantage that the more items there are to be coded, the less mnemonic, or memory aiding, the symbols become.

Mnemonic symbols are not well adapted to tabulating machine practice, due to the use of letters and fractions, the length of the symbols, the non-uniformity of digit position, and the variable length of symbols.

Where these symbols are encountered, the simplest, but least efficient method of conversion is to assign numbers to the letters and fractions of the symbols. This makes machine operation possible, but adds more digits and does not overcome any of the other difficulties.

The usual mnemonic code makes use of at least twenty letters of the alphabet. Should one be encountered which uses only ten, it immediately becomes possible to substitute letter type in the tabulator, thus avoiding decoding and the need for additional digits.

In most cases it will be necessary to revise the entire coding system to a numerical basis, and to use the new code as an internal medium for tabulating use until such time as the mnemonic symbols are dropped. In building the new code, an attempt should be made to preserve as many of the symbols as can readily be accommodated. The principles for doing this are outlined under "Significant Digit Codes."

### Letter Type Codes

The term "Letter Type Codes" has been applied to codes requiring the use of letter type in the numerical tabulator to print names and abbreviations instead of numbers. The objective of such codes is to eliminate all decoding, and allow a numerical accounting machine to accomplish some of the results of the alphabetic accounting machine in producing final reports.

The following code was worked out in one case to give certain units and measures directly in their lettered abbreviations:

Name	Printed Result	Code Number
Pounds	LB.	36
Ounces	OZ.	69
Grams	GM.	27
Grains	GN.	28
Pints	PT.	74
Quarts	QT.	84
Litres	LT.	34

Name	Printed Result	Code Number
Gallons	GL.	23
Kilograms	KG.	52
Cubic Cent.	CC.	11
Sticks	ST.	94
Pieces	PC.	71
Tablets	TB.	46
Cans	CN.	18
Cartons	CT.	14
Misc.	M.	07

The arrangement of letter type in the tabulator which was found to give these results is shown below:

	First Column	Second Column
1 —	C	C
2 —	G	G
3 —	L	L
4 —	T	T
5 —	K	A
6 —	O	B
7 —	P	M
8 —	Q	N
9 —	S	Z

The zero positions on the tabulator are arranged so that they do not print when one of the columns is unpunched. If there is assurance that there will be no unpunched columns, a letter type may be placed in the zero position, thus giving ten letters per column.

In some cases it will be found simpler to supply complete alphabets in three columns each, rather than to attempt to study the frequency of letters. The following shows the type arrangement:

	1 2 3	4 5 6
1	A J S	A J S
2	B K T	B K T
3	C L U	C L U
4	D M V	D M V
5	E N W	E N W
6	F O X	F O X
7	G P Y	G P Y
8	H Q Z	H Q Z
9	I R	I R

The principal disadvantages under this plan are that the uneven spacing of the printed names, abbreviations, or symbols makes them less legible, and that more card columns are required.

The two-letter code first illustrated brings out the advantage of studying the frequency of letters. Without such a study, this code would apparently require two complete alphabets, or six columns. Instead, it is found that letters can be fitted into two columns, which is no

more than would be required to code numerically.

The following is an example of the type arrangement of a special seventeen-digit code requiring one bank and part of another in the accounting machine:

	1 2 3 4 5 6 7 8 9 0	1 2 3 4 5 6 7
0-	A A A A B A A A A C	A A B A A C C
1-	B E C C C C I C D D	B E C C C D E
2-	C H D F E D M E E E	C H E E E E H
3-	F I E I F E N I H I	D I F J H H I
4-	I O F K I H O N K K	F K I N M I M
5-	M P I N J I P P N P	J M N P N P R
6-	O R M O N N R R O R	M O O R R R S
7-	P S N R O O S S R S	P R S S S S T
8-	S T S S P R T T S T	S S T T T T W
9-	W U T T U U U W T Y	W U U W Y W Y

This permits the printing of a number of words and abbreviations applicable to a confectionery business. A few examples follow:

	1 2 3 4 5 6 7 8 9 0	1 2 3 4 5 6 7
A	S S T H A R D	C A N D Y
B	E T T E R E A T	M I N T S
B	U T T E R	W A F E R S
P	E C A N	F R E S H
W	H I T E R O C K	C A N D Y
S	T F F R U I T	F A N C Y
	S T E A M E R	B A S
S	O F T M I N T	C R E A M S
A	S S T H A R D	C E N T E R S
S	T F D A T E S	
P	E A N U T	B R I T
S	P E C A S S T	C H O C
B	I T T E R S	C H O C
	F R U I T	D A I N T I E
	N U T	P A T T Y

The initial step in constructing codes of this type is to list all the names, abbreviations, or symbols which are needed, and then to arrange them as they should print.

Next determine and record on a work sheet the letter frequencies represented in each column, with the first letter of the word or abbreviation assigned to the first column, the second letter to the second column, etc. These data will, in most cases, disclose the fact that there are more letters to be used in some columns than the nine or ten spaces available in a column on a card, and that the same letter is to be used in more than one column. The number of times a letter is used in each column should be carefully analyzed in an effort to consolidate it with the same letter contained in a column on either side, and also to main-



tain the wording or the abbreviation. As these changes are made, the number of times each letter is used in each column should be corrected on the work sheet until the final arrangement has been determined.

The original arrangement of the descriptive matter may be such as to congest the letter requirements to the right of the code, since the arrangement of the wording usually contains the name of an article preceded by a description thereof, such as:

Blank	Paper	Bitter Sweet	Chocolate
Wall	"	Hard Center	"
Newsprint	"	Cream	"
Bag	"	Nut Center	"
Ledger	"	Assorted	"
Bond	"		
Manila	"		

An inversion or reversal of order for part of the list by placing the name before the description will often relieve the letter congestion. Changes may also be made in abbreviations as the requirements and limitations become more clearly determined.

From this point on, it is a continued re-adjustment of the original work sheet until only nine or ten letters are needed in each column, and the words, abbreviations, or symbols still remain legible. The zero position should be used only when absolutely necessary. Blank space between letters of a word should be avoided if possible.

Another method for studying letter frequencies for large codes consists of the original recording of the names in normal order and the counting of initial letters as mentioned before. The ten letters with the highest count are then retained, and all names starting with other letters are moved one column to the right. A count is then made of the second letter, determining the ten which are to be retained and moving others again to the right. This is continued until a basic arrangement has been attained. Further adjusting is then made for names which have not been accommodated, and the final code is determined.

When more than one bank of a tabulator is required for the code, care should be taken to see that a word will print within the limits of a bank, and that it is not split between banks. Considerable attention also should be given to the location of the letter type in the machine banks, so that they are not in disuse for other work more than is absolutely necessary.

Simple codes of ten digits may often be arranged with letter type in the machine so that

they print single characters, double characters, or even triple characters, and thus decode themselves when tabulated.

The use of any letter type of coding requires the prepunching of cards when more than two or three columns are devoted to letters. Master cards with the duplicator or gang punch may be used to accomplish this prepunching.

**Cryptic Codes**

The use of dual tabulating cards as original records has given rise occasionally to the need of designing or suggesting codes which are more or less secret in nature, but which can be translated by the tabulating machines in a normal manner. This applies more often to the coding of "Cost," "Selling Price," or other money amounts than to the coding of products, names, or accounts.

One of the simplest methods of handling such a condition is to express the factor in letters which really represent numbers, showing these letters on the card field under a heading which is intended to be misleading. For example:

FACTORY	COST
A K O H R	000.00
B L 1 O M	111.11
C M 2 L N	222.22
D N 3 D P	333.33
E O 4 V L	444.44
F P 5 T D	555.55
G Q 6 U V	666.66
H R 7 W Q	777.77
I S 8 X T	888.88
J T 9 Y W	999.99

(Meaning)

Thus a cost of \$132.79 would apparently be "Factory BN2WW," and since no letter type is placed in the tabulator, it would indicate and add in the normal manner.

The dial phone system employs this principle, although not for the purpose of secrecy. Letters appear on the dials and names are apparently dialed, but the equipment utilizes numbers only. The arrangement is given below in the event that some application may be found for the principle:

A, B or C	- 1	M, N or O	- 5
D, E or F	- 2	P, R or S	- 6
G, H or I	- 3	T, U or V	- 7
J, K or L	- 4	W, X or Y	- 8

The numerals "0" and "9" are not utilized in this code, but the plan might be altered to assign only two letters to one number, including all ten digits.

Another cryptic code which has been encountered is the inversion of digits:

$$\$23.17 = \$32.71 \text{ or } \$27.31$$

In using this code, the plugging of the tabulator is made to restore the amounts to their normal sequence. A variation of the above is to insert digits which have no meaning, the plugging of the tabulator again restoring to normal.

$$\$23.17 = \$230.17 \text{ or } \$302.71$$

Another more complex method is based on multiples of value represented by numbers, starting from some arbitrary point other than zero. The first step under this method is to set the value of each multiple, although amounts varying in one-cent intervals must be expressed by one-cent multiples.

Having selected the money value of each number, an arbitrary zero point is selected, such as 500, 513, 700 or any other number.

Assuming that 513 has been selected and that each additional number represents three cents, the following would be true.

513	—	\$ .00
514	—	.03
515	—	.06
793	—	8.40
942	—	12.87
		etc.

This is not readily decoded, but a series of these prices may be totaled by machine, and the true value determined by a calculation. Take the following items:

Code Value	True Value
793	\$ 8.40
942	12.87
1020	15.21
590	2.31
612	2.97
<hr/>	<hr/>
3957	\$41.76

The machine total would be 3957, and the card counter is used to indicate that 5 prices are involved. Since zero was set at 513, there are therefore 5 x 513 or 2565 dead numbers in the tabulated total. Subtracting these gives 3957—2565 or 1392 as the true numerical total. Multiplying this by the unit value of \$.03 per number gives \$41.76, or the true value.

A variation of the above is obtained by setting the starting point at less than zero. When this is done, the above formula applies, except that the dead numbers are added to the tabulated total instead of subtracted.

There are certain short-cuts which may be used in converting tabulated code amounts to true values. These, however, must be worked out individually for specific cases, as all are dependent on the particular way in which the code is used.

## Numerical—Alphabetical Codes

### Partial Sequence—Short Lists

This is the simplest type of numerical-alphabetical code, and appears as follows:

01 — A		
01	01	Acme Engineers
01	02	Adam Construction Co.
01	03	Ahloin & Son
01	04	Ajax Construction Co.
01	05	etc.
01	99	
02 — B		
02	01	Baker & Thomas
02	02	Balmat & Sons
02	03	Bannon, Jas. L.
02	04	Baptist, J. R.
02	05	etc.
02	99	
03 — C		
03	01	Caldwell Engineering Co.
03	02	Callahan, W. E.

03	03	Calumet Const. Co.
03	04	Cameron-Joyce & Co.
03	05	etc.
03	99	

26 — Z		
26	01	Zastrow & Lasher
26	02	Zimmerly Bridge Co.
26	03	Zimmerly, Frank
26	04	Zolpher & Sons
26	05	etc.
26	99	

The first two digits represent the initial letter, and the last two are assigned to individual names. The original list is coded in exact alphabetical sequence, but all new names are simply assigned the next open numbers under the proper initial letters, thus gradually destroying the original sequence and making this a partial sequence code.

This method should not be employed where the list of names is so long that some letter

groups would have more names than can be readily scanned for reference or decoding, nor should the principle be expanded to include the second letter of the alphabet on the same basis, as four digits would be required to express only 26 times 26 or 676 divisions. Four digits normally should give 9999 divisions. In most cases it is advisable to have twenty-seven initial letters, "Mc" being regarded as a separate letter.

This type of coding does not require the use of a numbered coding register book, since new names are assigned the next open numbers, and a card file or ordinary code list may be used for determining these open numbers.

In using a code of this kind, a study should be made to determine whether final digit designations might prove beneficial, since significant information can be obtained by assigning these numbers according to the principles set forth in "Final Digit Codes."

code may be classed the following device for sorting to as many as six initial letters of a name. It is not a code, but performs some of the functions of a code. It can not be indicated, controlled, or printed by the tabulating machine, but is useful for sorting only.

Triple punching is employed in a four-column card field, the columns being divided as follows:

	12	12	12	12	
Sect. 1	11	11	11	11	Sect. 2
	0	0	0	0	
	1	1	1	1	
<hr/>					
	2	2	2	2	
Sect. 3	3	3	3	3	Sect. 4
	4	4	4	4	
	5	5	5	5	
<hr/>					
	6	6	6	6	
Sect. 5	7	7	7	7	Sect. 6
	8	8	8	8	
	9	9	9	9	

**Condensed Alphabetic Sorting**

Along the lines of the simple alphabetical

Each separate section represents one letter, and the punching is as shown below:

Sect. 1—First Initial      Sect. 3—Second Letter      Sect. 5—Fourth Letter  
 Sect. 2—First Letter      Sect. 4—Third Letter      Sect. 6—Fifth Letter

A	-	-	-	-	-
B	-	12	-	2	-
C	-	11	-	3	-
D	-	0	-	4	-
E	-	1	-	5	-
F	12	-	2	-	6
G	12	12	2	2	6
H	12	11	2	3	6
I	12	0	2	4	6
J	12	1	2	5	6
K	11	-	3	-	7
L	11	12	3	2	7
M	11	11	3	3	7
N	11	0	3	4	7
O	11	1	3	5	7
P	0	-	4	-	8
Q	0	12	4	2	8
R	0	11	4	3	8
S	0	0	4	4	8
T	0	1	4	5	8
U	1	-	5	-	9
V	1	12	5	2	9
W	1	11	5	3	9
XY	1	0	5	4	9
Z	1	1	5	5	9

By means of this punching, and with selective sorting, it is possible to arrange any cards, so punched, in almost complete alphabetical sequence without devoting more than two columns to each three letters. Under the alphabetical coding method, six columns would be required for each three letters.

### Partial Sequence—Long Lists

This type of code breaks down the alphabetical groups beyond initial letter without the use of extra digits, and appears as follows:

A	1 — 19	B	340 — 359
Ac	20 — 39	Bae	360 — 379
Ad	40 — 59	Bak	380 — 399
Ag	60 — 79	Bal	400 — 419
Al	80 — 99	Bam	420 — 439
Ale	100 — 119	Bar	440 — 459
All	120 — 139	Bari	460 — 479
Als	140 — 159	Barn	480 — 499
Am	160 — 179		
Ame	180 — 199	Wom	9840 — 9859
An	200 — 219	Wood	9860 — 9879
And	220 — 239	Wool	9880 — 9899
Ap	240 — 259	Wr	9900 — 9919
Ar	260 — 279	Wu	9920 — 9939
Arm	280 — 299	X-Y	9940 — 9959
At	300 — 319	Yo	9960 — 9979
Au	320 — 339	Z	9980 — 9999

The names are assigned to the next open numbers under their respective alphabetical groups, and therefore will not be in complete alphabetical order beyond the original groups, thus making this a partial sequence code.

The construction of such a code is as follows: The number of names to be coded is first ascertained, as well as the amount of expansion required. These determine the number of digits necessary in the final code. Although a four-digit code has been illustrated, the above calculation may indicate that a three-, four-, or five-digit capacity may be required.

No more than ten, twenty, or thirty numbers should be assigned to an alphabetical division. Therefore the total code capacity is next divided by one of these figures to determine the number of divisions. The smaller the number chosen, the finer will be the alphabetical break-down. The code illustrated is based on twenty numbers to a division.

The complete known alphabetical list of names is then counted and marked off into the number of equal parts which has been determined as above. This roughly fixes the alphabetical groups constituting the code, and slight adjustments, where dividing lines occur in the middle of groups, gives the final code as illustrated previously.

In the event that a known list of names is not available or is, for some reason, considered not representative, a city directory, phone book, correspondence file, or other related list may be used to build the code. It will be found more satisfactory in most cases to use an actual list, since the frequencies of certain names vary greatly with different enterprises and localities.

For the same reason it is better to design a separate code for each application, following the principles set forth herein, than to attempt to utilize one of the many published codes which have been designed for filing systems generally.

The coded names need not be registered in a numbered book, although it is advisable to have a code list or other medium for determining the next open numbers.

Significant names may be designated by assigning them to numbers ending in zero, so that the initial sort may be utilized to separate them without any additional effort.

It is also common practice to have a code of this kind start with 100, 1,000, 10,000, or 100,000 as the case may be, rather than with 1, so that all names are designated with a like number of digits. In this event the numbers with fewer digits may be assigned to auxiliary, miscellaneous, or special items, the fewer number of digits serving to identify them quickly and in many cases eliminating the need of a second code.

### Complete Sequence—All Lists

This type of code is used where it is necessary to sort and list in complete alphabetical order down to the final letter. It is recorded on register sheets or a numbered book which appears as follows:

#### Sheet 39

00 Heland Co., Inc.	50 Hell Gate Packers
01	51
02	*52 Hellman Co., Inc.
03	53
04	54
05 Helbruin Polish Co.	55 Helmtrath Bottle Co.
06	56
07	57
*08 Held Adams & Co.	58
09	59
10 Held Baking Co.	60 Heloran & Co.
11	61
44	94
45 Helier's Drug Stores	95 Helpern Spec. Co.
46	96
47	97
48	98

The construction of this code is exceedingly simple when undertaken in the right way. The first step is the counting of the names on the list to be coded, and the estimation of proper allowance for expansion. This determines the number of digits and the total code capacity.

The code capacity is then divided by the number of known names on the list. This gives the exact factor of expansion, and should not be adjusted to round numbers except when resulting in a fraction, in which case the next lower whole number must be taken. For example, should the above computation result in the figure 7.341 the factor used would be "7".

Numbered sheets are then prepared, 100 numbers to the sheet or page. As many sheets are prepared as are necessary for the total code capacity.

The names are then entered on the sheet, skipping as many spaces between each name as the factor of expansion indicates. The factor of expansion of the code illustrated was "5", therefore the names of the original list were entered opposite each fifth number. The first name on "Sheet 0" must not be entered opposite "01" as thereby no expansion would be provided before this name. It is advisable to start with "03" or "04". It is also desirable to change the starting point on each sheet so that the ending numerals will be evenly distributed for machine sorting.

Care must be taken in preparing the register to see that all computations have been made correctly, and that names are entered correctly, or the last page will be reached and more names may be left than available spaces. A check-up toward the end will show whether this condition exists, and if so the factor of expansion may be reduced so that the remaining names will fit in.

New names as they occur are entered in the middle of the available vacant numbers so that expansion is still left on both sides for other new names (see \* on illustration). This permits of an exact alphabetical sequence and provides a complete sequence code.

It is necessary that obsolete and discontinued names be eliminated at regular intervals so that numbers may be later re-assigned and the complete alphabetical sequence thus preserved indefinitely.

#### Complete Sequence—No List

This method of coding can be used where the complete list of names to be coded is not available, but where a master code is necessary

as coding instruction or to insure uniformity.

An example of this case might be the coding of customers by branch houses where each branch operates its own code, and numbers are not assigned at the home office. In a case of this kind, the same coding scheme would be in effect at all branches, the branch number being used to differentiate the customers.

If the correct basis is used, this code will keep the names in perpetual order by alphabetical arrangement to the last letter. It must, however, be kept in register form so that new numbers can be assigned intelligently.

The steps of construction are as follows:

(1) Select a list of names, such as a directory or trade list, which it is estimated will compare favorably in name frequencies with the list to be built.

(2) Divide this basic list into as many equal parts as is estimated will not cause more than thirty names to fall in one division.

(3) Adjust these divisions slightly so that they conform with the nearest alphabetical groups.

(4) Number the divisions from "1" up and record the master code as follows:

A	— 1	Af	— 9
Ab	— 2	Ah	— 10
Abe	— 3	Ai	— 11
Ac	— 4	Al	— 12
Ad	— 5	Ald	— 13
Adams A	— 6	Ale	— 14
Adams L	— 7	Alk	— 15
Add	— 8	All	— 16

(5) Prepare numbered register sheets, each sheet with 100 numbers, and record the alphabetical division and number at the top of each sheet.

As names occur, they are inserted on the sheets in the middle of the available vacant numbers. Thus, the first name in any group would be assigned to No. 50, the second to Nos. 25 or 75, and so on. This allows a perpetual alphabetical sequence. The code number of any name consists of a combination of "Sheet No." and "Line No." unless complete numbers have been shown on each line.

Final digit designations may be used with this code to designate key names, although care must be taken that they do not interfere with the alphabetical sequence.

In the event that no list is available, and it does not appear practical to build a code from some related list, the following table of num-

NAME CODE — 1000 DIVISIONS

<b>A</b>	1 Abe 2 Able 3 Able 4 Able 5 Able 6 Able 7 Able 8 Able 9 Able 10 Able 11 Able 12	<b>B</b>	13 Bac 14 Bac 15 Bac 16 Bac 17 Bac 18 Bac 19 Bac 20 Bac 21 Bac 22 Bac 23 Bac 24	<b>C</b>	25 Cab 26 Cab 27 Cab 28 Cab 29 Cab 30 Cab 31 Cab 32 Cab 33 Cab 34 Cab 35 Cab 36 Cab 37	<b>D</b>	38 Cad 39 Cad 40 Cad 41 Cad 42 Cad 43 Cad 44 Cad 45 Cad 46 Cad 47 Cad 48 Cad 49 Cad 50	<b>E</b>	51 Cae 52 Cae 53 Cae 54 Cae 55 Cae 56 Cae 57 Cae 58 Cae 59 Cae 60 Cae 61 Cae 62 Cae 63	<b>F</b>	64 Caf 65 Caf 66 Caf 67 Caf 68 Caf 69 Caf 70 Caf 71 Caf 72 Caf 73 Caf 74 Caf 75 Caf 76	<b>G</b>	77 Cag 78 Cag 79 Cag 80 Cag 81 Cag 82 Cag 83 Cag 84 Cag 85 Cag 86 Cag 87 Cag 88 Cag 89	<b>H</b>	90 Cah 91 Cah 92 Cah 93 Cah 94 Cah 95 Cah 96 Cah 97 Cah 98 Cah 99 Cah 100 Cah 101 Cah 102	<b>I</b>	103 Cai 104 Cai 105 Cai 106 Cai 107 Cai 108 Cai 109 Cai 110 Cai 111 Cai 112 Cai 113 Cai 114 Cai 115	<b>J</b>	116 Caj 117 Caj 118 Caj 119 Caj 120 Caj 121 Caj 122 Caj 123 Caj 124 Caj 125 Caj 126 Caj 127 Caj 128	<b>K</b>	129 Cak 130 Cak 131 Cak 132 Cak 133 Cak 134 Cak 135 Cak 136 Cak 137 Cak 138 Cak 139 Cak 140 Cak 141	<b>L</b>	142 Cak 143 Cak 144 Cak 145 Cak 146 Cak 147 Cak 148 Cak 149 Cak 150 Cak 151 Cak 152 Cak 153	<b>M</b>	154 Cak 155 Cak 156 Cak 157 Cak 158 Cak 159 Cak 160 Cak 161 Cak 162 Cak 163 Cak 164 Cak 165	<b>N</b>	166 Cak 167 Cak 168 Cak 169 Cak 170 Cak 171 Cak 172 Cak 173 Cak 174 Cak 175 Cak 176 Cak 177 Cak 178	<b>O</b>	179 Cak 180 Cak 181 Cak 182 Cak 183 Cak 184 Cak 185 Cak 186 Cak 187 Cak 188 Cak 189 Cak 190
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<b>P</b>	191 Cak 192 Cak 193 Cak 194 Cak 195 Cak 196 Cak 197 Cak 198 Cak 199 Cak 200 Cak 201 Cak 202	<b>Q</b>	203 Cak 204 Cak 205 Cak 206 Cak 207 Cak 208 Cak 209 Cak 210 Cak 211 Cak 212 Cak 213 Cak 214	<b>R</b>	215 Cak 216 Cak 217 Cak 218 Cak 219 Cak 220 Cak 221 Cak 222 Cak 223 Cak 224 Cak 225 Cak 226	<b>S</b>	227 Cak 228 Cak 229 Cak 230 Cak 231 Cak 232 Cak 233 Cak 234 Cak 235 Cak 236 Cak 237 Cak 238 Cak 239	<b>T</b>	240 Cak 241 Cak 242 Cak 243 Cak 244 Cak 245 Cak 246 Cak 247 Cak 248 Cak 249 Cak 250 Cak 251 Cak 252	<b>U</b>	253 Cak 254 Cak 255 Cak 256 Cak 257 Cak 258 Cak 259 Cak 260 Cak 261 Cak 262 Cak 263 Cak 264	<b>V</b>	265 Cak 266 Cak 267 Cak 268 Cak 269 Cak 270 Cak 271 Cak 272 Cak 273 Cak 274 Cak 275 Cak 276 Cak 277	<b>W</b>	278 Cak 279 Cak 280 Cak 281 Cak 282 Cak 283 Cak 284 Cak 285 Cak 286 Cak 287 Cak 288 Cak 289 Cak 290	<b>X</b>	291 Cak 292 Cak 293 Cak 294 Cak 295 Cak 296 Cak 297 Cak 298 Cak 299 Cak 300 Cak 301 Cak 302 Cak 303 Cak 304	<b>Y</b>	305 Cak 306 Cak 307 Cak 308 Cak 309 Cak 310 Cak 311 Cak 312 Cak 313 Cak 314 Cak 315 Cak 316 Cak 317 Cak 318	<b>Z</b>	319 Cak 320 Cak 321 Cak 322 Cak 323 Cak 324 Cak 325 Cak 326 Cak 327 Cak 328 Cak 329 Cak 330 Cak 331
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<b>A</b>	332 Cak 333 Cak 334 Cak 335 Cak 336 Cak 337 Cak 338 Cak 339 Cak 340 Cak 341 Cak 342 Cak 343	<b>B</b>	344 Cak 345 Cak 346 Cak 347 Cak 348 Cak 349 Cak 350 Cak 351 Cak 352 Cak 353 Cak 354 Cak 355	<b>C</b>	356 Cak 357 Cak 358 Cak 359 Cak 360 Cak 361 Cak 362 Cak 363 Cak 364 Cak 365 Cak 366 Cak 367 Cak 368	<b>D</b>	369 Cak 370 Cak 371 Cak 372 Cak 373 Cak 374 Cak 375 Cak 376 Cak 377 Cak 378 Cak 379 Cak 380 Cak 381	<b>E</b>	382 Cak 383 Cak 384 Cak 385 Cak 386 Cak 387 Cak 388 Cak 389 Cak 390 Cak 391 Cak 392 Cak 393 Cak 394	<b>F</b>	395 Cak 396 Cak 397 Cak 398 Cak 399 Cak 400 Cak 401 Cak 402 Cak 403 Cak 404 Cak 405 Cak 406 Cak 407	<b>G</b>	408 Cak 409 Cak 410 Cak 411 Cak 412 Cak 413 Cak 414 Cak 415 Cak 416 Cak 417 Cak 418 Cak 419 Cak 420	<b>H</b>	421 Cak 422 Cak 423 Cak 424 Cak 425 Cak 426 Cak 427 Cak 428 Cak 429 Cak 430 Cak 431 Cak 432	<b>I</b>	433 Cak 434 Cak 435 Cak 436 Cak 437 Cak 438 Cak 439 Cak 440 Cak 441 Cak 442 Cak 443 Cak 444 Cak 445	<b>J</b>	446 Cak 447 Cak 448 Cak 449 Cak 450 Cak 451 Cak 452 Cak 453 Cak 454 Cak 455 Cak 456 Cak 457 Cak 458	<b>K</b>	459 Cak 460 Cak 461 Cak 462 Cak 463 Cak 464 Cak 465 Cak 466 Cak 467 Cak 468 Cak 469 Cak 470 Cak 471	<b>L</b>	472 Cak 473 Cak 474 Cak 475 Cak 476 Cak 477 Cak 478 Cak 479 Cak 480 Cak 481 Cak 482 Cak 483 Cak 484	<b>M</b>	485 Cak 486 Cak 487 Cak 488 Cak 489 Cak 490 Cak 491 Cak 492 Cak 493 Cak 494 Cak 495 Cak 496 Cak 497	<b>N</b>	498 Cak 499 Cak 500 Cak 501 Cak 502 Cak 503 Cak 504 Cak 505 Cak 506 Cak 507 Cak 508 Cak 509 Cak 510	<b>O</b>	511 Cak 512 Cak 513 Cak 514 Cak 515 Cak 516 Cak 517 Cak 518 Cak 519 Cak 520 Cak 521 Cak 522 Cak 523
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<b>P</b>	524 Cak 525 Cak 526 Cak 527 Cak 528 Cak 529 Cak 530 Cak 531 Cak 532 Cak 533 Cak 534 Cak 535	<b>Q</b>	536 Cak 537 Cak 538 Cak 539 Cak 540 Cak 541 Cak 542 Cak 543 Cak 544 Cak 545 Cak 546 Cak 547 Cak 548	<b>R</b>	549 Cak 550 Cak 551 Cak 552 Cak 553 Cak 554 Cak 555 Cak 556 Cak 557 Cak 558 Cak 559 Cak 560 Cak 561	<b>S</b>	562 Cak 563 Cak 564 Cak 565 Cak 566 Cak 567 Cak 568 Cak 569 Cak 570 Cak 571 Cak 572 Cak 573 Cak 574	<b>T</b>	575 Cak 576 Cak 577 Cak 578 Cak 579 Cak 580 Cak 581 Cak 582 Cak 583 Cak 584 Cak 585 Cak 586 Cak 587 Cak 588	<b>U</b>	589 Cak 590 Cak 591 Cak 592 Cak 593 Cak 594 Cak 595 Cak 596 Cak 597 Cak 598 Cak 599 Cak 600 Cak 601	<b>V</b>	602 Cak 603 Cak 604 Cak 605 Cak 606 Cak 607 Cak 608 Cak 609 Cak 610 Cak 611 Cak 612 Cak 613 Cak 614	<b>W</b>	615 Cak 616 Cak 617 Cak 618 Cak 619 Cak 620 Cak 621 Cak 622 Cak 623 Cak 624 Cak 625 Cak 626 Cak 627	<b>X</b>	628 Cak 629 Cak 630 Cak 631 Cak 632 Cak 633 Cak 634 Cak 635 Cak 636 Cak 637 Cak 638 Cak 639 Cak 640 Cak 641	<b>Y</b>	642 Cak 643 Cak 644 Cak 645 Cak 646 Cak 647 Cak 648 Cak 649 Cak 650 Cak 651 Cak 652 Cak 653 Cak 654 Cak 655	<b>Z</b>	656 Cak 657 Cak 658 Cak 659 Cak 660 Cak 661 Cak 662 Cak 663 Cak 664 Cak 665 Cak 666 Cak 667 Cak 668 Cak 669
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<b>A</b>	670 Cak 671 Cak 672 Cak 673 Cak 674 Cak 675 Cak 676 Cak 677 Cak 678 Cak 679 Cak 680 Cak 681	<b>B</b>	682 Cak 683 Cak 684 Cak 685 Cak 686 Cak 687 Cak 688 Cak 689 Cak 690 Cak 691 Cak 692 Cak 693 Cak 694	<b>C</b>	695 Cak 696 Cak 697 Cak 698 Cak 699 Cak 700 Cak 701 Cak 702 Cak 703 Cak 704 Cak 705 Cak 706 Cak 707	<b>D</b>	708 Cak 709 Cak 710 Cak 711 Cak 712 Cak 713 Cak 714 Cak 715 Cak 716 Cak 717 Cak 718 Cak 719 Cak 720	<b>E</b>	721 Cak 722 Cak 723 Cak 724 Cak 725 Cak 726 Cak 727 Cak 728 Cak 729 Cak 730 Cak 731 Cak 732 Cak 733	<b>F</b>	734 Cak 735 Cak 736 Cak 737 Cak 738 Cak 739 Cak 740 Cak 741 Cak 742 Cak 743 Cak 744 Cak 745 Cak 746	<b>G</b>	747 Cak 748 Cak 749 Cak 750 Cak 751 Cak 752 Cak 753 Cak 754 Cak 755 Cak 756 Cak 757 Cak 758 Cak 759	<b>H</b>	760 Cak 761 Cak 762 Cak 763 Cak 764 Cak 765 Cak 766 Cak 767 Cak 768 Cak 769 Cak 770 Cak 771 Cak 772	<b>I</b>	773 Cak 774 Cak 775 Cak 776 Cak 777 Cak 778 Cak 779 Cak 780 Cak 781 Cak 782 Cak 783 Cak 784 Cak 785 Cak 786	<b>J</b>	787 Cak 788 Cak 789 Cak 790 Cak 791 Cak 792 Cak 793 Cak 794 Cak 795 Cak 796 Cak 797 Cak 798 Cak 799 Cak 800	<b>K</b>	801 Cak 802 Cak 803 Cak 804 Cak 805 Cak 806 Cak 807 Cak 808 Cak 809 Cak 810 Cak 811 Cak 812 Cak 813	<b>L</b>	814 Cak 815 Cak 816 Cak 817 Cak 818 Cak 819 Cak 820 Cak 821 Cak 822 Cak 823 Cak 824 Cak 825 Cak 826 Cak 827	<b>M</b>	828 Cak 829 Cak 830 Cak 831 Cak 832 Cak 833 Cak 834 Cak 835 Cak 836 Cak 837 Cak 838 Cak 839 Cak 840	<b>N</b>	841 Cak 842 Cak 843 Cak 844 Cak 845 Cak 846 Cak 847 Cak 848 Cak 849 Cak 850 Cak 851 Cak 852 Cak 853	<b>O</b>	854 Cak 855 Cak 856 Cak 857 Cak 858 Cak 859 Cak 860 Cak 861 Cak 862 Cak 863 Cak 864 Cak 865 Cak 866
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erical-alphabetical divisions is given for general use. This table should not be employed unless absolutely necessary, as it will not be found to apply to certain types of names and

certain localities.

The full 10,000 divisions of the table may be used or a smaller code may be constructed by taking every second or third division.

### Representative Codes

Any of the basic principles of coding just described may be adapted to simplify various phases of accounting routines. Although the types of coding are limited, the range of applications is extremely wide, and seldom do two problems have exactly the same code as a solution. Careful planning and ingenuity can

be used in the construction of a code to make it instrumental in simplifying the handling of special peculiarities that are distinctive of each individual business. Several types of commonly used codes are illustrated to show their general construction and their application to specific types of work.

#### FACTORY EXPENSES (Major Acct. 90)

Combine Major Account with Intermediate and Minor Accounts. For example: Production Department Salaries would be coded 90-010-015.

Inter- mediate	Minor	Factory Expenses	Inter- mediate	Minor	Factory Expenses
-010	xxx	General Factory Salaries	-060	xxx	Supplies and Lubricants
	-011	Executive Office		-061	Cutting Oils and Compounds
	-012	Accounting Dept.		-062	Abrasives
	-013	Purchasing Dept.		-063	Finishing Materials
	-014	Rate Setting Dept.		-064	Machine Lubricants
	-015	Production Dept.		-065	Fuel Oil and Gas
	-016	Factory Service Dept.		-069	General Supplies
	-017	Planning and Routing Dept.			
	-018	Stock Chasing Dept.	-070	xxx	Light-Heat-Power
-020	xxx	Departmental Supervision		-071	Power Plant Labor
	-021	Foremen and Assistants		-072	Fuel Used
	-022	Set-up Labor		-073	Supplies and Lubricants
	-023	Shop Clerks		-074	Equipment Maintenance
-030	xxx	Inspection of Product		-075	Water Purchased
	-031	Work in Process		-079	Electric Current Purchased
	-032	Completed Equipment	-080	xxx	Defective and Damaged Product
	-033	Tool Equipment		-081	Parts Scrapped
	-034	Finished Parts		-082	Reworking Parts and Equip- ment
	-035	Parts for Export		-083	Loss on Returned Defective Equipment
-040	xxx	Handling and Storing Product		-085	Allowances on Orders Im- properly Filled
	-041	Unloading Purchased Material		-089	Field Repairs to Defective Equipment
	-042	Storekeeping			
	-043	Inter-Department Trucking	-090	xxx	Office Expenses
	-044	Outside Trucking Service		-091	Stationery and Supplies
	-045	General Freight and Express		-092	Tabulating Service
	-046	Cleaning, Weighing & Count- ing Parts		-093	Postage
	-047	Motor Truck Operation		-094	Telephone
-050	xxx	Labor Adjustments		-095	Telegraph
	-052	Hourly Rate Guarantee			
	-053	Time Unaccounted for			
	-055	Waiting Time			

## FACTORY EXPENSES (Major Acct. 90)—Continued

Inter- mediate	Minor	Factory Expenses	Inter- mediate	Minor	Factory Expenses
-100	xxx	Factory Engineering	-400	xxx	Building Maintenance and Service
	-111	Factory Changes in Standard Equipment		-401	Maintenance of Buildings
	-112	Laboratory Production Engineering		-402	Janitor Service
	-120	Specification Clerks		-403	Elevator Service
	-130	Special Tracings and Wiring Diagrams		-404	Watchman Service
	-140	Reworking Parts due to Engr. Changes		-405	Fire Protection
	-150	Blueprinting		-406	Water Purchased (General use)
	-161	Electrical Laboratory		-409	Ground Upkeep
	-162	Mechanical Laboratory	-500	xxx	Equipment Maintenance
	-163	Chemical Laboratory		-501	General Machinery
	-164	Metallurgical Laboratory		-502	Dies, Jigs, Fixtures, Etc.
	-169	Other Laboratory Expense		-503	Small Tools and Cutters
	-170	Tool Designing and Ordering		-504	Electrotype and Type
	-180	Reworking Tools due to Engr. Changes		-505	Power Transmission
	-190	Other Factory Engineering		-506	Motors
				-507	Furniture and Fixtures
				-508	Unclassified Equipment
				-509	Supervision
				-510	Cleaning and Oiling Machinery
-200	xxx	Welfare	-600	xxx	Factory Expense Recovered
	-201	Band		-611	Scrap Sold
	-203	Club Activities		-612	Handling and Loading
	-204	Safety Protection		-620	Foremen's Productive Time
	-205	Educational and Training Expense			
	-208	Medical and First Aid	-700	xxx	Depreciation of Assets
	-209	General Welfare		-701	Buildings
	xxx	Country Club Expense		-709	Building Equipment
	-211	Salaries and Wages		-711	Power Plant
	-214	House Supplies and Expenses		-712	Transmission Lines
	-215	Maint. of Bldgs., Equip't and Grounds		-721	General Machinery
	-216	Rental Property Maintenance		-722	Dies, Jigs, Fixtures, Etc.
	-217	Insurance and Taxes		-723	Small Tools and Cutters
	-218	Light, Heat, Power, Water and Telephone		-724	Drawings and Patterns
	-219	Depreciation of Bldg. and Equip't.		-725	Furniture and Fixtures
	xxx	Country Club Revenue		-726	Tool Equipment with Vendors
	-222	Revenue from Rooms		-729	Unclassified Equipment
	-226	Rental Property Revenue	-800	xxx	Accrued and Deferred Charges
				-801	Inventory Obsolescence and Contingencies
-300	xxx	Other Unclassified Expenses		-802	Annual Inventory Expense
	-301	Factory Traveling		-811	Employees Compensation Insurance
	-302	Departmental Rearrangement		-812	Fire Insurance Premiums
	-303	Adapting Stock Equip't to Orders		-820	Factory Property Taxes
	-304	Supper Allowance			
	-305	Suggestion Contests	-900	xxx	Inter-divisional Expense Adjustment
	-306	Federal Check Tax		-901	Rental
	-307	Production and Cost Control		-902	Power
	-309	Unclassified (Itemize and describe)			



## GEOGRAPHIC CODES

To assist the users of International Electric Accounting Machines, a book has been prepared by International Business Machines Corporation covering symbol or code classifications of States, Counties, and all Cities of the United States of 2,500 minimum population. All the practical geographic analyses required by the users of IBM products have been considered in the preparation of this code and it is for their use and service that the book has been compiled.

Following is a list of these groupings with their corresponding code:

			Population Code
Cities having 1,000,000 or more			1
" "	500,000 to 1,000,000		2
" "	250,000 to 500,000		3
" "	100,000 to 250,000		4
" "	50,000 to 100,000		5
" "	25,000 to 50,000		6
" "	10,000 to 25,000		7
" "	5,000 to 10,000		8
" "	2,500 to 5,000		9
" "	less than 2,500		0

## State, County, and City Codes

The book shows, in figures, the population of every state, and the population of every county. It contains a code number for every state and county, and of every city of a population of 2500 or more, as well as a code number for the population group into which the city falls. Two digits have been assigned to state, three digits to county, and three digits to city.

When the population indication is not desired the code for population can be disregarded with the resultant saving of one column of the tabulating card.

## Cities Located in More Than One County

Where a city extends into more than one county, both county code numbers are shown opposite the city. The county in which the greater part of the city's population is located is the first listed. For example:

## Population Code

All cities in the United States have been classed according to their population (1930 census). The Code numbers under the caption "Pop. Group" indicate the population groups.

State	County	City	City	Pop. Group
01	113	077	Phenix City	7
01	081	077	Second Co.	7

## STATE CODES

State Code	STATE	State Code	STATE	State Code	STATE	State Code	STATE
01	Alabama	14	Kansas	26	Nevada	38	South Carolina
02	Arizona	15	Kentucky	27	New Hampshire	39	South Dakota
03	Arkansas	16	Louisiana	28	New Jersey	40	Tennessee
04	California	17	Maine	29	New Mexico	41	Texas
05	Colorado	18	Maryland	30	New York	42	Utah
06	Connecticut	19	Massachusetts	31	North Carolina	43	Vermont
07	Delaware	20	Michigan	32	North Dakota	44	Virginia
08	Florida	21	Minnesota	33	Ohio	45	Washington
09	Georgia	22	Mississippi	34	Oklahoma	46	West Virginia
10	Idaho	23	Missouri	35	Oregon	47	Wisconsin
11	Illinois	24	Montana	36	Pennsylvania	48	Wyoming
12	Indiana	25	Nebraska	37	Rhode Island	49	Dist. of Columbia
13	Iowa						

## VERMONT—Code 43

Population { 380,000 Estimated, July, 1936  
359,511 Official, 1930

## COUNTIES

State	County	COUNTY	Population	State	County	COUNTY	Population	State	County	COUNTY	Population
43	001	Addison	17952	43	011	Franklin	29975	43	021	Rutland	48453
43	003	Bennington	21655	43	013	Grand Isle	3944	43	023	Washington	41733
43	005	Caledonia	27253	43	015	Lamoille	10947				
43	007	Chittenden	47471	43	017	Orange	16694	43	025	Windham	26015
43	009	Essex	7067	43	019	Orleans	23036	43	027	Windsor	37416

## CITIES

State	County	City	CITY	Pop. Group	State	County	City	CITY	Pop. Group
43	005	T 001	Barnet	9	43	019	C 023	Newport	8
43	023	C 003	Barre	7	43	021	V 025	Proctor	9
43	023	T 005	Barre	9	43	025	T 027	Rockingham	8
43	025	V 007	Bellows Falls	9	43	021	C 029	Rutland	7
43	003	V 009	Bennington	8	43	011	C 031	St. Albans	8
43	021	T 011	Brandon	9	43	005	V 033	St. Johnsbury	8
43	025	V 013	Brattleboro	8	43	027	V 035	Springfield	9
43	007	C 015	Burlington	6	43	021	T 037	West Rutland	9
43	007	T 017	Colchester	9	43	027	V 039	Windsor	9
43	027	T 019	Hartford	9	43	007	C 041	Winooski	8
43	023	C 021	Montpelier	8					

"C", "T", and "V" preceding city code designates whether City, Township or Village.

## PURCHASED MATERIAL CLASSIFICATIONS

010 ABRASIVES	040 CASTINGS—ALUMINUM, ZINC, ETC.
010 Miscellaneous	041 Sand Castings
011 Grinding Wheels	042 Die Castings
012 Emery Paper, etc.	050 CASTINGS—BRASS AND BRONZE
013 Sandblast and Tumbling Materials	060 IRON AND STEEL CASTINGS—FORGINGS
014	061 Sand Castings
015 Polish Materials	062 Steel Forgings
020 ACIDS, CHEMICALS AND LUBRICANTS—	100 GLASS
PLATING SUPPLIES	110 HARDWARE AND SCREWS
020 Miscellaneous	110 Miscellaneous
021 Acids	111 Locks
022 Miscellaneous Chemicals	112 Machine Screws and Cap Screws
023	113 Wood and Miscellaneous Screws
024 Lubricants	114 Bolts
025 Cutting Oils	115 Nails
026	116 Cotter Pins, Washers and Nuts, Taper Pins
027 Plating Suplies, Anodes, etc.	130 INSULATING MATERIALS
030 BRASS, BRONZE, AND ALUMINUM	130 Miscellaneous
030 Miscellaneous	131 Bakelite—sheet stock
031 Bar Stock—rounds, hexagons	132 Tubing and Rod
032 Flat Stock—squares	133 Fabricated Parts—bakelite
033 Sheets	134 Yarn
034 Tubing	
035 Extruded and Pinion	
036 Beryllium—all forms	
037 Aluminum—all forms	

PURCHASED MATERIAL CLASSIFICATIONS—*Continued*

- 150 LUMBER  
 150 Lumber—all other  
 151 Oak  
 152 Pine  
 153 Veneer Panels
- 170 PACKING SUPPLIES  
 170 Miscellaneous  
 171 Shook Boxes  
 172 Paper Containers  
 173 Wrapping Materials, Strapping
- 180 PAINTS AND VARNISHES (FINISHING MATERIALS)  
 180 Misc. Finishing Materials  
 181 Undercoats  
 182 Baking Finishes  
 183 Lacquers  
 184 Insulated Varnishes  
 185  
 186  
 187 Wood Finishing Materials  
 188  
 189 Paints—maintenance, etc.
- 200 RESALE MATERIAL  
 200 All Other  
 201 Radio Material  
 202 Employees' Material
- 210 STEEL AND IRON  
 210 H.R. Steel—flat, round and square  
 211 Bar Stock—rounds, hexagons C.D.  
 212 Flat Stock—squares  
 213 Strip and Sheets  
 214 Tubing  
 215 Drawn or Extruded Shapes  
 216 Norway Iron—all forms  
 217 Tool Steels  
 218 Music Wire—spring steels  
 219 Alloy Steels
- 220 WIRE—FIXTURE AND CABLE, MAGNET  
 220 Miscellaneous  
 221 Rubber Insulated Fixture Wire  
 222 Flame Proof Fixture Wire  
 223 Cables  
 224 Magnet Wire  
 225 Resistance Wire
- 230 PURCHASED PARTS  
 230 Miscellaneous  
 231 Partially Machined Parts  
 232 Completely Machined Parts  
 233 Sheet Metal Parts  
 234 Stampings  
 235 Spun Parts  
 236 Gears  
 237 Bearings—ball and roller  
 238 Standard Purchased Parts  
 239
- 240 Motors  
 241 Synchronous Motors  
 242 Resistors and Condensers  
 243 Contacts  
 244 Transformers and Rectifiers  
 245 Bells, Buzzers, Horns, etc.  
 246 Telephone Apparatus  
 247  
 248 Dials  
 249  
 250 Springs  
 251 Ribbons  
 252  
 253 Type  
 254  
 255 Plugwire Assemblies  
 256 Attachment Cords  
 257  
 258 Molded Parts
- 400 FUEL (POWER AND LIGHT)  
 400 Miscellaneous  
 401 Coal  
 402 Gas  
 403 Electricity
- 410 MISCELLANEOUS (GENERAL SUPPLIES)  
 410 General Supplies  
 411 Electrical Supplies  
 412 Belting  
 413  
 414 Lamps  
 415 Machine Parts  
 416  
 417  
 418 Repairs—bldgs. and equip.
- 420 STATIONERY AND SUPPLIES
- 430 SMALL TOOLS  
 430 Miscellaneous  
 431 Drills and Counterbores  
 432 Taps and Dies  
 433 Reamers  
 434 Mills  
 435 Files  
 436  
 437 Inspection Gauges  
 438 Inspection Gauges—maintenance  
 439 Field Maintenance Tools
- 440 PAPER—ALL OTHER
- 500 CONSTRUCTION
- 610 TOOLS AND DIES
- 640 MACHINERY
- 650 MACHINERY PARTS
- 660 FURNITURE AND EQUIPMENT
- 680 MISCELLANEOUS

### Automatic Coding

Numerical codes for the identification of products, geographic areas, individuals, balance sheet accounts, and other items have been advantageously employed in the use of International Electric Accounting Machines. The transcription of alphabetic nomenclature into simple, concise numerical classifications, such as those described in the part on Codes, is the first operation in the accounting routine.

#### Code Cards

Any detail transaction to be recorded on a tabulating card may carry one or more fields of identifying or classification data. When the number of such fields is limited, it is a simple matter to make manual notations on the original document of the code from an established code book, or to train the punch operator to memorize the necessary numerical codes. When this information appears in several fields of the tabulating card and is permanently fixed, regardless of the time at which the transaction occurs, and is an item which recurs frequently, it is advantageous to set up, on a single card, the complete code of all of such detail items. A record of this type eliminates the necessity of referring to more than one book of codes.

The development of the Duplicating Key Punch opened new fields for the simplification of the coding operation by combining the coding and punching operations through the use of a punched master code card. The punched holes of the master card are sensed by means of brush contacts. This completes an electrical circuit that results in the operation of the punching keys corresponding to the holes of the master card.

In this way, common information is automatically transcribed to the detail tabulating cards. For example, a bill of goods was sold

to the Excelsior Mfg. Co., containing four different items. Four cards would be punched—one for each product item for the purpose of preparing detail sales analysis. As the analysis of these sales items would be made according to salesman, branch, customer, state, class of trade, etc.,—these classification data would have to be punched in each of the detail cards. To accomplish this a punched master code card would be selected from a file by reference to the name of the company—Excelsior Mfg. Co. This card, carrying the coded information, would automatically transfer the coded data to the first detail card. The operator would then manually punch the remaining data pertaining to the first product appearing on the body of the invoice. As the second card appears in the machine, the coded data would again be automatically transcribed and the subsequent specific detail of the second item could then be manually punched. The third and fourth cards would likewise be punched by a combination of automatic machine duplication and manual punching.

This use of a code card with the Duplicating Key Punch has four distinct advantages:

1. It eliminates the necessity for manually posting codes from a code book to the detail record.
2. It eliminates the necessity for verification of the accuracy with which the clerk transcribed the coding information from the master code book.
3. It eliminates the necessity for manually punching the coded information in the detail cards.
4. The automatic accuracy obtained by the duplicating mechanism eliminates the necessity for verification of the punching operation.

TERRITORY NO. 13	NAME Excelsior Mfg. Co.	
STATE NO. 06	ADDRESS	
CITY NO. 002	CITY Bridgeport	STATE Conn.
CUSTOMER NO. 57	TERRITORY	
COMPANY 1	COMPANY	
	REMARKS	

Customer Code Card







ORDER COST SUMMARY CARD											
FINAL DISTRIBUTION											
CONCL		CLASS	SUB		ACCT.		TYPE		ORDER	TOTAL	TOTAL
									NO.	HOURS	AMOUNT
0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80  
 I.B.M. 5080  
 LICENSED FOR USE UNDER PATENT 1,772,492

Coded Summary Card

is checking off the item on a preprinted list with some standard mark (V or X). This is frequently used to limit the responses to be analyzed on a questionnaire and also to simplify recording on original documents.

**Addressing Plates**

Whenever addressing plates are used to imprint original documents, provision may be made to incorporate one or more lines of pertinent codes. This is usually done in connection with customer invoices, employee time cards, and check-writing.

**Blueprinting**

Production explosion, the ordering and scheduling of parts for assembly operations, is usually based upon data that are typed on tracing

paper so that blueprints can be readily prepared. The inclusion of part number and other numerical codes can be used to reduce subsequent manual coding and insure accuracy.

**Other Methods**

The routines outlined above are suggestive of the short-cuts that can be utilized. Among the others are:

1. Use of catalog or item number on order forms.
2. Rubber stamps for name and number of individuals, departments, branches, etc.
3. Use of block codes for major groupings of detail classifications.
4. Prefixes of preprinted serial numbers.
5. Use of significant digit codes.

**Decoding**

Finished numerical reports from the electric bookkeeping and accounting machines must be decoded to be generally acceptable. Provision, therefore, should be made to simplify the routine for recording or indicating the necessary descriptive data at a convenient position on the report. One or more of the following decoding procedures may be adapted to meet specific conditions.

**Alphabetic Decoding Card**

When the alphabetic tabulator is available,

it is possible to secure completely decoded reports through the use of the alphabetic decoding card. A single card with alphabetic description is punched for each code number appearing in the chart of accounts, payroll lists, or other accounting codes. The numerical code field in each of the detail cards is aligned with the master card field so that the decoding card may be automatically sorted in front of each detail group. By this means the decoded description will be indicated from the first card



**ACCOUNT No. 384—TRANSPORTATION EQUIPMENT**

CO. SERIAL NO. CARD NO. DATE OF INSTALLATION MO.      YR. WORK ORDER NO. TOTAL COST	STATISTICAL "A" 1 AUTO WASHERS 2 BATTERIES, ELEC. VEHICLE 3 BATTERY CHARGING EQUIPT. 4 BENCHES 5 BRAKE EQUIPMENT 6 CHASSIS 7 COMPRESSED AIR SYSTEM 8 CONVEYING EQUIPMENT 9 GASOLINE DISPENSING SYS.	STATISTICAL "C" 1 PASSENGER CARS 2 PORTABLE POWER TOOLS 3 PUMPS 4 STORAGE FACILITIES 5 TESTING EQUIPMENT 6 TIRE EQUIPMENT 7 TRACTORS 8 TRAILERS 9 TRUCK BODIES, SPARES	UNIT OF PROPERTY CITY, TOWN, VILLAGE	CONTINUING PROPERTY RECORD FORM NO. 37 0 1 2 3 4 5 6 7 8																																																																																																																																																																																																									
	STATISTICAL "B" 1 HOISTING EQUIPMENT 2 MACH. TOOLS, POWER DRIVEN 3 MARINE EQUIPMENT 4 MISCELLANEOUS GENERAL 5 MISCELLANEOUS MACHINES 6 MISCELLANEOUS TOOLS 7 MOTORCYCLES & SIDECARS 8 MOTORS 9 PARTITIONING, ENCL'S ETC.	STATISTICAL "D" 1 TRUCKS 2 VALVE EQUIPMENT 3 WELDING EQUIPMENT 4 FIRE EXTINGUISHER EQUIPT.	REFERENCE LOCATION																																																																																																																																																																																																										
	DATE RETIRED MO.      YR.		DRAWER NO. FROM CARD NO.																																																																																																																																																																																																										
	R. O. NO.		FOLIO      SERIAL      TO CARD NO.																																																																																																																																																																																																										
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*Pre-coded Lists*

CUSTOMER'S ORDER NO. AND DATE <b>16324 2/28/36</b> SIGNED BY <b>A.M. Adams</b> REQUISITION NO.	REFER TO INVOICE NO. <b>31234</b> INVOICE DATE <b>3/2/36</b>
[ Endicott Johnson Corporation, Payroll Department, North Street, Endicott, N. Y. ]	
[ 2481-04-37-04-193-21-148-1918-01 ]	

<b>87072</b>
33      WILSON E. DIMMICK      236

*Coded Addressing Plates*

SPECIFICATION & BILL OF MATERIAL										No. 142085
NAME <b>GEAR SHIFT LOCK ASSEMBLY (MEDIUM FEED)</b>										DWG. SIZE <b>A</b> No. OF SHEETS <b>1</b> SHEET <b>1</b>
WHERE USED <b>Final Assembly 142000</b>										ORDER NO. [REDACTED]      QUANTITY [REDACTED]      DATE [REDACTED]
										No. 142085
LOCATION OF STOCK	QUAN. REQ.	QUAN. ISSUED	PART NO.	DWG.	NO. PER UNIT	DESCRIPTION				
			39841	A	2	Stop pin				
			109199	A	2	Rivet				
			112936	A	2	Rivet				
			141603	A	1	Gear shift lock (Medium Feed)				
			141399	A	1	Gear shift lock knob				
			141406	A	1	Snap ring retaining cam				
										MADE BY ABC      APPD. DEF      DATE TYPED 4-24-36

*Coded Bill of Material*

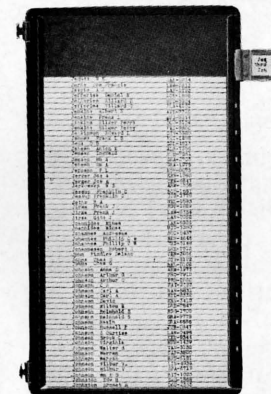


BRANCH MONTHLY EXPENSE STATEMENT													
BRANCH		Philadelphia										MONTH OF	May
	ACCT. NO.	ORDER NO.	CURRENT MONTH					YEAR TO DATE					
			BUDGET	EXPENSE	% OF NET SALES	OVER BUDGET	UNDER BUDGET	BUDGET	EXPENSE	% OF NET SALES	OVER BUDGET	UNDER BUDGET	
<b>DIRECT EXPENSE</b>													
Advertising	301	301	4	563	414			149	6756	13585		6829	
Commissions	303	303	4	30	796		766		360	1118		758	
Management Salaries	305	305	4	450	450				5400	5400			
Management Traveling	307	307	4	250	331		81		3000	4136		1136	
Salesmen's Salaries	309	309	4	1800	1561			239	21600	23853		2253	
Salesmen's Traveling	311	311	4										
<b>TOTAL DIRECT</b>	<b>312</b>	<b>312</b>	<b>4</b>	<b>3093</b>	<b>3552</b>		<b>459</b>		<b>37116</b>	<b>48092</b>		<b>10976</b>	
<b>INDIRECT EXPENSE</b>													
Auto Expense	314	314	4										
Cartage	315	315	4	125	125				1500	1525		25	

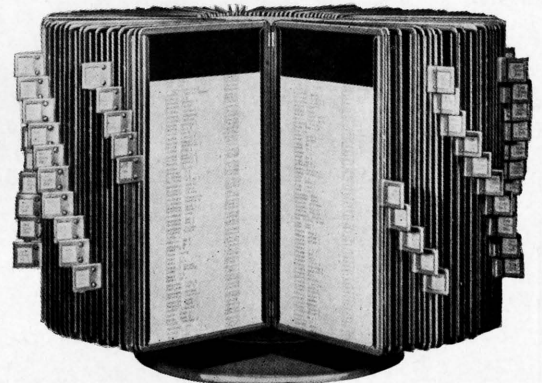
Preprinted Form

CODE		LABOR									
0—MONTHLY MEN 1—CONTRACT 2—DAY WORK		DAILY REPORT OF EXPENSES									
POINT		Month of <u>Dec.</u>									
ACCOUNT	DATE	POINT	CODE	AMOUNT	TOTAL	SHOP EXPENSE					
1. M. of E. Steam Locos.	12	34	10	1335	14248 *	53.57					
			11								
			12	12913							
2. M. of E. Expenses			20	18214	259350 *	1011.47					
			21								
			22	241136							
3. M. of E. Pass. Ca			30	7146	74791 *	291.68					
			31	22286							
			32	45359							
4. M. of E. Fr			40	13217	102674 *	400.43					
			41	40985							
			42	48472							
Transport			60	3066							
6. Expense Acc											

Overlapping Form



Visible Files



AGENTS COMMISSION STATEMENT									
R-1603 SM-1-32, A. S. B. Co. Source of Entry (All Copies Attached)									
★ 11 Equipment Orders 13 Supply Orders 17 Rental Orders 31 Collections—Suspense Accounts 32 Other Cash Receipts 41 Cash 42 Rent 50 C Journals 60 G Journals 70 Credit Memoranda 81 Supplies Purchased 90 Voucher Register									
Mr. _____ Agency _____									
Page Number _____ Date _____ 193__									
AGENT	SOURCE OF ENTRY	ORDER NO	REFERENCE	AMOUNT CHARGED	AMOUNT CREDITED	DEBIT	BALANCE	CREDIT	

Decoding Legend

**List of Stockholders or Dividend Payees**

of the NATIONAL MANUFACTURING COMPANY COMMON Stock  
 According to the Records of Bank and Trust Company Dividend No. 35  
 at close of business 3/31/32 Payable 4/10/32

NAME AND ADDRESS	STOCK-HOLDER NO.	SHARES	DIVIDEND AMOUNT	CHECK NO.	REMARKS
TOTALS BROUGHT FORWARD:		7238	1085700		
Anderson & Fox, 43 Broad St., New York, N. Y.	699-0134 1017	1017 1017	699	104850	1221
Charles M. Anderson, Chamber of Commerce, Memphis, Tenn.	100-0128 1023	1023 1023	100	15000	1222

Plate Stencil Decoding

**Plate Stencils**

If addressing equipment and plates are available, they may be advantageously used for decoding. This method is commonly used in the decoding of payrolls. The plates which are used ordinarily for preparing time cards and checks are utilized to print the employee name and number on the margin of the tabulated Payroll Register. Man number printed from the addressing plate may be visually checked for correspondence with that listed by the accounting machine directly from the payroll cards.

**Use of Dual Cards**

Oil companies sometimes use a unique method of reducing the work of decoding in connection with customer billing. Purchasers possessing credit cards sign a copy of a dual tabulating card at the time of purchase, which carries

the detail concerning the transaction. When these cards have been brought together at the central accounting office, they are sorted according to customer number and listed on the tabulator to prepare the customer's statement. The signed cards are attached to a copy of the statement and forwarded to the customer. This not only furnishes a quick method of decoding but also gives the complete detail of each transaction in event that any item might be questioned.

**Letter Type for Printing Tabulators**

Special letter type may be inserted on the printing unit of the numerical accounting machine to prepare decoded reports. This method is generally used only for one-column codes; but it may also be adapted to printing complete names of articles or items that would ordinarily have to be decoded.

TO: Wm. H. Campbell 314 East 64th Street Apt 5-H New York City 125 - 050800 <b>REAL ESTATE MANAGEMENT CO.</b> 70 BROADWAY NEW YORK, N.						<b>REAL ESTATE MANAGEMENT CO.</b> 70 BROADWAY NEW YORK, N. Y. <b>CASHIER'S RECORD</b>					
FROM		ITEM	TO		ARREARS	CURRENT	TOTAL	CODE			AMOUNT
MONTH	DAY		MO.	DAY				HOUSE	SPACE	ITEM	
5	01	RENT			12500			125	50800	1	12500
3	25	ELECT	4	27	874			125	50800	2	874
3	25	TAX	4	27	17			125	50800	3	17
3	27	GAS	4	30	180			125	50800	5	180
4	18	REPAIR			2850			125	50800	8	
6	01	RENT				12500		125			

Letter Type Decoding