nations used in any of the accompanying exhibits, except with reference to the problem before me. These will necessarily be different to some extent in every industry. They may differ even within the same industry.

The rules here given are compiled especially for a master index, made under the unlimited root method, but they are, with few exceptions, equally applicable to either method, or both. Before giving these rules, I wish to emphasize the exact relation of the two methods, and make it clear that the acceptance of the unlimited root method does not conflict with the principle involved in the limited root method.

EXHIBIT C — Root sheet (first page) of Index under the Limited Root Method.

The principal difference is in flexibility and utility. The limited root index is like an arbitrary code, whereas the unlimited root index is like an alphabet or vocabulary, from which—through using the symbols in combination—any number of codes may be written.

In the limited root method the real root is largely dependent upon the way in which the *symbol is* used unless we limit *their* use to the three roots expressed by the group Expense, Product, and Construction, to which they belong.

In the unlimited root method, each symbol is complete within itself, and is no more affected by the way in which it is used, or by combination with other symbols than are words.

The three fundamental principles sought after in working out these rules have been—brevity, standardization of terms, and sequence in relationship. The facility of symbols in expressing these fundamentals to which words and phrases are but clumsily adapted soon recommends them, even though the principle is not consciously understood; and has the effect of making the symbols apt and easy of use.

Words in language and their relationship—or lack of it, are the product of chance influences, such as the pursuits and temperament of the primitive people who originated them, the influence of earlier and contemporary languages, etc. The sequence of designations in symbols, on the contrary, is built up in a direct causal relationship, the subordinate growing out of the more basic terms, as the leaves of a tree grow out of the twigs, the twigs out of the branches, and the branches out of the parent limb.

Coming to the actual construction of the symbols, the method of accounting should first be determined upon, including the sub-division of accounts, not only for the general ledger, but for statistics as well, and also the method of

EXHIBIT D—Root sheet (first page) of Master Index under the Unlimited Root Method.

closing the books. Before going much farther, the actual accounting symbols should be completed and thoroughly tested.

The tying-in of the accounting methods with the index is an essential of a proper index for an industry. The selection of the root letters is materially affected by the method of accounting, and every accounting symbol should not only designate, but should at the same time be a derivative of the accounting significance of the item represented by the symbol.

The sub-division of accounts is indicated in the symbols by the order in which the letters occur, reading always from the root toward the end of the symbol. The closing of accounts may be indicated in reverse order by reading the symbol backwards.

The master index should be fairly well developed as a whole and laid out in pencil, and finally revised only as the actual plan of management is determined upon and as Standing Instructions are written.

If the index is not fairly well developed as a whole, prior to the full development of any one root, it is almost inevitable that it will be unbalanced. On the other hand, it is

impossible to perfect it beyond the accounting system, except in piecemeal as investigation and classification go forward.

We should bear constantly in mind the fact that the majority of persons who will be called upon to use an index have not trained minds, nor a knowledge of the business, nor an understanding of the principles on which the index is constructed, to aid them in reading the symbols. No pains should be spared to make the index absolutely mnemonic. Fine distinctions in the meaning of words should always be sacrificed to the selection of words which may be literally symbolized.

In the foregoing page of Root Letters under the unlimited root method (exhibit D), containing seventeen designations for twenty-two letters, there is only one designation which is not entirely mnemonic; as J and K, used instead of I and O respectively, may fairly be regarded as mnemonic.

RULES

All root designations with definitions, should be written on one sheet constituting the first page of the master index (exhibit D).

Each root designation should in turn be written at the head of a separate sheet, and the designations (with definitions) representing the first qualifications of the root, listed below (exhibit E).

EXHIBIT E — A second page under the Unlimited Root Method.
Also illustrates the locating of index letter and cutting of sheet for automatic indexing.

Each succeeding qualifying designation, preceded by preceding designation, should in turn be written at the head of a separate sheet, and further qualifications made in like manner (exhibit F).

I, O and Z are not used because they are easily confused with the numerals 1, 0, and 2.

Q is not used because it is difficult to write accurately.

Words beginning with I and O should be used as designations as little as possible, and when used, should be placed opposite J and K respectively. This is because J and K are seldom used, and therefore, confusion through double meaning will be infrequent.

Words beginning with Q and Z may easily be omitted as designations, and therefore no provision need be made for them.

Numerals may be used as designations. They are often desirable and sometimes necessary where there are more qualifications than there are letters. They should be put before the designation which they qualify instead of after it as with letters.

Numerals may be used at the end of a symbol only to indicate sequence in the thing symbolized, as order or lot number, etc.

Every designation should, as far as possible, begin with the letter which is to represent it in the index. To accomplish this, all qualifying designations, at any given stage in the construction of a symbol, should first be written opposite the letter with which the designation begins. This will frequently cause several designations to be placed opposite the same letter, at this preliminary stage.

Dealing with the letters opposite which there are several designations, one at a time, look over the designations, and select the one least used. Then consult a thesaurus (an essential in making a mnemonic index) and see if you cannot substitute some word beginning with a letter which has no designation opposite it, and which for symbolic purposes will be equally descriptive.
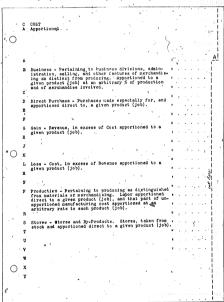

EXHIBIT F—A third page under the Unlimited Root Method.
Also illustrates the locating of index letter and cutting of sheet for automatic indexing.

You will be surprised at the frequency with which you find a better word. Even if the word is not as good, it is more important that the designation should be mnemonic than literal, so long as it is symbolic of the definition of the designation. Repeat this process until there is not more than one designation apportioned to any one letter.

When you use a letter to indicate a word beginning with some other letter than the one opposite which it is