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## Perpetual inventory and stores control [revised]

Chamber of Commerce of the United States of America. Department of Manufacture

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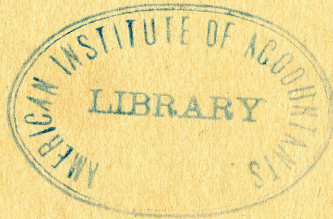
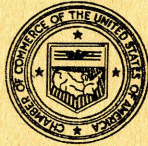
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# PERPETUAL INVENTORY AND STORES CONTROL

[Revised]



DEPARTMENT OF MANUFACTURE  
CHAMBER OF COMMERCE OF THE UNITED STATES  
WASHINGTON, D. C.

# Perpetual Inventory and Stores Control

[Revised]



DEPARTMENT OF MANUFACTURE  
(Fabricated Production Department)  
CHAMBER OF COMMERCE OF THE UNITED STATES  
WASHINGTON, D. C.

# Department of Manufacture

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## FOREWORD

*This pamphlet was first published early in 1922, when industry generally had not passed the period of industrial stagnation and inventories of raw and processed materials in the store rooms of manufacturers were excessive. Under such conditions, it was felt that a pamphlet on the control of inventories was particularly timely.*

*The subject is no less timely now. Although conditions have changed, the changed conditions have brought with them a greater need than ever for the close control of every feature of the operation of manufacturing plants. Moreover, the principles of the perpetual inventory have been found universally applicable and the general desire for their application is apparent. The pamphlet, therefore, should be of no less value now than in the earlier period.*

*It has been a source of gratification that the pamphlet has been so favorably received by executives over the country and the demand is so widespread and continuous that it has been found desirable to review the text and include much new material. The pamphlet is thus reissued at this time and is available to anyone interested in the development of a perpetual inventory and stores control system.*

*June, 1924.*

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# Perpetual Inventory and Stores Control

In an article in the Nation's Business, Samuel Vauclain, President of the Baldwin Locomotive Works, made the following significant statement to illustrate the money value of machinery and equipment used in a factory:

"I illustrated by throwing some money on the ground, which the men all ran after to pick up. This explained very forcibly the fact that everybody would scramble to pick up money, but that nobody there seemed to have the slightest desire to pick up the machinery lying around, all over the shop floor, each piece of which was more valuable than any of the money which I had scattered. They all saw the point at once, and thought it was a good way to demonstrate the reckless manner in which they were handling things."

What is thus so well stated by Mr. Vauclain with respect to machinery may be applied with equal truth and propriety to the handling of raw and semi-finished material and supplies. When capital is in the form of cash it is carefully protected, its receipt and disbursement safeguarded, its custodians held to a strict accounting, but once this capital is converted into materials there is a tendency to become lax, to lose sight of the value of the investment, to husband the capital less diligently, to tolerate practices that are wasteful, inefficient and needlessly expensive.

The purpose, then, of a perpetual inventory and stores control system is to husband the investment in the materials and supplies which are utilized in the manufacture of the company's product. There is no royal road by which to accomplish this desirable end, but it is hoped in this pamphlet to set out some of the underlying considerations connected with the development of such a system, so that the manufacturer desirous of perfecting a practical and efficient control may do so.

## THE ADVANTAGES OF CONTROL

The all important and really basic reason for the control of inventories has just been stated, but it will be well to present a

number of advantages underlying this basic reason that come from the operation of a perpetual inventory and stores control system. They all contribute to the ultimate desired result:

1. A properly devised perpetual inventory and stores control system will keep at a minimum the company's investment in materials and supplies.

In a general way the company's investment in its productive materials fluctuates directly with the demand for its products. Consequently the purchasing of its materials must be so attuned to the sales of the company's product that there will be no surplus investment. Naturally for a going business there is a minimum of production materials and supplies that must always be kept on hand. This minimum depends upon a number of things, such as the supply and demand for each material itself, the time required for delivery after placing the order for a material, the economical quantities in which to purchase, and so on. A good stores control system and perpetual inventory keeps all of these factors in balance.

2. A properly devised stores control system will bring about the delivery of materials of the proper quality to men and machines in the right amount and at the time when they are needed.

The stores control system will be synchronized with the production control system; in fact, usually the stores control system is considered a part of the production planning of the factory.

3. The stores control system will provide for the scrutiny of materials purchased to see that they are in accordance with purchase specifications.

This means that incoming materials will be checked for amounts, quality and condition.

4. The stores control system will make for good factory housekeeping.

There will be a place for everything and everything in its place. Materials will be located where they can be readily found and accessible for use, protecting them against climatic and atmospheric conditions and, if fragile, against breakage. There will be the proper precautions against theft and the unauthorized and injudicious issuance to the factory. There will be economy in storage space. Close study will be given the most economical and convenient equipment for handling materials.



5. A properly devised perpetual inventory will make possible most readily the preparation of profit and loss statements and balance sheets of the company.

Where there is no reliable perpetual inventory the company's investment in its materials and supplies is never known accurately without the making of an expensive and laborious physical inventory, stopping production and proving a general nuisance.

6. The perpetual inventory will provide the means for the control of costs of individual products.

Materials are issued against orders only when authorized and thereby the cost department's records are protected. Without the perpetual inventory system cost accounting is made difficult if not impossible.

7. The perpetual inventory and proper control of stores will make possible the elimination of the expensive and sometimes unreliable annual physical inventory.

The perpetual inventory provides for the constant checking of actual stocks on hand with the perpetual inventory records in a business like and routine way. Errors are caught almost as soon as they occur. Thefts of material are located promptly. Slow moving and obsolete materials are brought to light. There is no waiting on the annual shutdown for stock taking.

These are a few of the more important advantages that come from the proper control of stock and the use of a perpetual inventory system. When such a plan has been put in use, other important advantages will be found. In the descriptions of the organization and procedure of the stores department and the methods of handling perpetual inventories, the significance of the advantages already outlined will be made more fully apparent.

#### ORGANIZATION

The organization arrangements of a stores department is a subject on which there are differing views. In some manufacturing companies it has been decided that the purchasing agent should exercise direct control of the factory stores department and its records, because of his responsibility for the purchase and adequacy of materials. In some other companies the stores department comes under the jurisdiction of the treasurer. In such cases it is argued that the treasurer is responsible for the company's funds and consequently should also be responsible for its inventories, which, like cash, are current

assets. Going further, it is held that to be responsible the treasurer must have control and consequently he is given supervision of stores.

It is undoubtedly true that those who hold these two views are in the minority. In by far the largest number of manufacturing plants the stores department comes under the jurisdiction of the manager of the factory. Stores to the plant manager are the same as the payroll fund to the payroll department, or an imprest or revolving fund to the manager of a branch house. Under this plan of organization the plant manager has authority over the requisitioning, storing and use of raw materials under restraints and safeguards that hold him strictly accountable.

Beyond this point the development of the stores department organization depends to some extent upon local conditions, such as the size of the plant, the character of its operations and its general organization structure. But while there may be many variations from a general plan, there is a scheme of organization which in its elements is so widely in use that it is worthy of description.

First as to purchasing. Under the older order of things the procurement of materials and supplies was undertaken directly by the general manager, assisted on details by a clerk. Gradually this clerk made the simpler purchases without the supervision from the chief. Now the purchasing agent's functions have gone still further and in many companies the purchasing agent, while still under the general supervision of the executive head of the plant, has large responsibilities and his position is one of great importance. The bounds of his responsibility and authority are, however, definitely marked out. Usually in the most fully developed organization he is responsible primarily for the negotiation of the purchase of definite quantities of materials of prescribed specifications. Frequently he is also responsible for expediting the delivery of this material, but in some of the largest companies this is no longer a part of the work of the purchasing agent but is a responsibility of the stores department.

The modern purchasing agent is, however, in no wise hampered by the establishment of these bounds to his work or is his job made less important. He can show his ability to the best advantage in the perspicuity and care he shows in making commitments for the required materials at the least cost to his company.

We now come to the place in the organization of the stores department. It is desirable first to consider the functions of this department. They are well defined and usually consist of the following:

1. Determining the quantities of materials needed for the orders placed by customers for the company's products and making requisition for their purchase.
2. Receiving, storing, and safeguarding of materials in stock.
3. Maintaining the perpetual inventory records.
4. Dispensing on proper authorization materials to the factory departments.

These are the functions that usually are comprised within a stores department.

In some plants the stores organization is included in the planning or production control department, if one is provided. In other plants the stores department is a unit by itself, the head of which is directly answerable to the factory manager.

The next points to be considered are the internal organization arrangements within the stores department. First of all, there must be set up the perpetual inventory record and arrangements made for its maintenance. Usually this is best handled by clerical employees in the central store or in the factory office. Here is where requisitions for the purchase of materials needed for production should be made.

Next there is the actual store-keeping organization, the force of stores clerks, porters and other employees engaged in receiving, storing and disbursing the materials. Where there are several or many of these employees they will come under an employee who may be known as the chief store-keeper, with rank in the organization equal to that of a foreman.

From this description of the organization of the stores department it may be imagined that there will be numerous employees and an expensive and cumbersome record-keeping system. There is no need for this in small plants. In larger ones naturally there will be more employees and more detail, but in small plants control can be secured and simplicity of organization and system preserved.

Whatever may be the extent of organization arrangements or number of employees involved, it is well to analyze this matter of stores control by dividing it into its component elements and with these elements clearly in view to make such organization arrangements as are desirable. In a small plant, for example, all of the work of the stores department may be handled

by one man. He will make the requisitions for purchase, he will keep the perpetual inventory record, he will receive and store the materials and give them out as required by the factory departments.

#### LOCATION AND ARRANGEMENT OF STORES

In a small plant there will be probably but one storeroom. This storeroom should be in a separate room or an enclosed space completely cut off from the factory departments. In many plants the storeroom is set apart by a high wire fence arrangement with a wicket or window and one or more large doors through which the materials may be moved. When not attended the storeroom should be kept under lock and key.

It will likely be found that some materials will be of such a character as not to lend themselves to economical storing in the enclosure. For example, if rough castings are made up ahead of orders as is sometimes done, they may be piled in an orderly way in a yard shed, or even in the yard itself. In such a case it should be understood by everyone that the storekeeper is responsible for these castings and if required for production they will be removed only after formal requisition. To carry such an arrangement beyond the handling of large or rough materials in such a way is dangerous, for where materials are accessible to the factory employees they are not under control. Some plants have experimented with the piling of materials either in the operating departments or adjacent to them, at the same time making the stock clerk responsible for them. With the best intentions under such conditions, the making of requisitions by foremen will be forgotten and materials will disappear and the remaining stocks will soon present a very disorderly condition.

In larger companies there is the problem of whether to maintain a central store or to have a number of stores located throughout the plant. Accessibility, of course, is an important consideration in favor of the multi-stores plan. Economy in stores service may call, however, for a central store. For example, if in a plant six stores were to be maintained accessible to the six manufacturing departments and kept open, a minimum of six store clerks would be needed. But if a central store is used it is possible that service may be effectively rendered by a lesser number.

The arrangement of material and manufactured parts in the storeroom will be by one of several possible plans. Under one such plan all materials are first classified as to their character. Each material is numbered or coded, (several generally

accepted plans here being available), and the arrangement in the storeroom is in accordance with this classification. Another plan is to place the materials in the storeroom in accordance with the convenience of location and frequency of receipt and withdrawal. A third plan applicable particularly to manufactured parts is the placing of all constituent parts in an assembly together in a storeroom. For example, all of the special parts used in the assembly of a particular electric controller will be placed adjacent to one another.

The study of shelves, bins and racks is important to secure both economy of space and ease of access. In one instance a company was employing standard steel bins for a number of its parts which, upon investigation, it was found could be handled better differently. In the case of steel balls, for example, wooden boxes to hold a standard number of each sized ball were constructed. Each box was provided with a vertical slot so arranged as to reveal the height of balls in the box at any time, and by means of a scale adjacent to the slot the number of balls remaining could be readily ascertained. Odd shaped pressed metal parts presented a problem, but a nesting arrangement was devised and these parts piled without support on the floor.

Some heavy materials, perhaps resting in store but a short time, may well be received on platforms delivered and removed by hand-operated or electric elevating trucks. Only by a careful study can the best arrangements for storing the various materials be arrived at.

Storeroom equipment should be adequate and efficient. Weighing scales should be of such size and character as to give reliable results and economy of operation. Where much material is to be weighed, dial scales are of value. Scale platforms should be so located as to avoid unnecessary lifting or movement of materials. Elevating machines for piling heavy or bulky material are often of value. "One man" hand trucks save labor. As previously mentioned, lift trucks employing wooden or steel platforms and moved by hand or electric power are often economical means of factory transportation. In short, every detail of storeroom layout, equipment and practice should be carefully studied. Having developed the most efficient practice nothing but the best housekeeping will maintain the store in a proper condition. Empty packing boxes, broken parts, defective materials, and litter generally should not be allowed to accumulate.

Materials that are perishable or likely to become shopworn should be given out in order of receipt. Materials that are sub-

ject to deterioration from dampness, from light, or other cause should be carefully guarded.

### THE PERPETUAL INVENTORY

What is the perpetual inventory? Briefly, it is a record of each item of material employed in the plant showing at least the quantity of materials received, the quantities disbursed and the balances on hand. Usually the perpetual inventory record is much more complete than this. There are, for example, spaces for the recording of purchase orders and their status as to fulfillment. Unit costs of materials purchased and remaining on hand are shown and, in some instances, the total cost value of the balance of the material on hand is provided. Likewise the amount of materials required for the completion of customers' orders is frequently shown.

The perpetual inventory record in large factories is usually kept in the main office of the stores department, and in small plants in the factory office, or even in the storeroom if all of the stores work is handled by one or two men.

What stock records other than the main perpetual inventory should be maintained? There are some who advocate the use of a bin stock record. Such a record usually is in the form of a small card hung on a hook beside, or on the wall, of each bin. The bin record shows receipts, disbursements and balances. There are many manufacturers who have found this record difficult to maintain and of no great practical value. The accuracy of the record is frequently upset by the failure of stock clerks to record receipts or disbursements when they are pressed for time in rendering service to the factory departments.

### PROCEDURE

The procedure in a stores department will be considered under three general headings, procurement, disbursement and record-keeping.

**PROCUREMENT.**—The perpetual inventory stock record as usually prepared contains all of the needed information to determine whether or not additional stocks of the material should be purchased. The record for each material will likely show a "minimum," that is, a figure for the total of stock on hand and on order, below which a requisition for a new purchase should be made. Very likely, also, the amount or quantity on a standard purchase order will be shown. This amount will take into consideration the minimum economical quantity to purchase and the extent of use of the material in the factory. For example,

in the case of some material it is not economical to buy less than carload quantities. Again, the general rule may prevail in the case of this material that an amount equivalent to two months' average production will be purchased. Taking into consideration these two factors, economical purchasing quantity and average monthly use, the unit purchasing quantity will be determined. This minimum, for example, may be two carloads.

The perpetual inventory card may also have space provided on which to show the requirements of orders placed by customers that call for the particular material. If orders on hand for the company's products call for more material than the amount on hand and on order, naturally an additional supply should be purchased, in such a case without regard to the minimum quantity above mentioned.

By way of summarizing it may be said that the purchase of material may be required because the material on hand and on order is less than a predetermined minimum quantity which has been established for the material, or, in the second case, while the material on hand and on order is in excess of this minimum it is less than the amount required for orders placed by customers for the company's product.

Where stores control has been extended the furthest all materials will have been standardized. For example, the chemical content will be prescribed if that is an essential element. Physical characteristics may be important; as, for example, with ingredients in rubber compounds, fineness is an important feature. Consequently all materials regularly and frequently used will be provided with simple but definite standard specifications. In such case the purchasing agent has a definite problem before him, the purchasing of a standard amount of a standard material.

Frequently requisitions for the purchase of raw materials in standard quantities of standard specification are initiated by the stock clerk in charge of the perpetual inventory record. Such a requisition on a printed form, making as many copies as are really needed, will probably be approved, first, by the head of the stores organization and likely by the plant manager as well. This requisition is the authority of the purchasing agent to make the purchase.

The matter of the required delivery is important. With everything running smoothly there will be no difficulty here. From previous experience the delivery that can be expected on each material will be known. It is a wise plan, however, to provide on the requisition a definite date by which delivery is ex-

pected. Requisitions conveying the statement "without delay" or "as soon as possible" are subject to any kind of interpretation by the purchasing agent and the vendor.

At times the question of delivery is of the utmost importance. When orders from customers have been received requiring prompt manufacture and delivery, materials may be needed in excess of normal quantities in a much shorter period than usual. In such an event the stores department should expect that the purchasing agent will take into consideration the demands of production and so arrange with the vendor that the stores department's request for delivery will be met.

As previously suggested, there are differing practices in regard to this matter of expediting deliveries of materials after the purchase order has been placed. In many plants the purchasing agent is responsible for this. In some cases, however, particularly in large plants, the stores department assumes the responsibility for expediting delivery. The advantages claimed for the latter plan briefly are that the stores department is more closely in touch with the needs of the factory production departments than the purchasing agent, and to acquaint the purchasing department with these facts necessitates an additional step in the procedure. Under the plan the stores department either writes, telegraphs or talks with the vendor in regard to the delivery, eliminating the purchasing department entirely, except in the most aggravated cases when extra pressure is put on by the purchasing agent.

The receipt and inspection of materials received from a vendor are frequently the duty of the stores department. In some cases the receiving clerk is provided with a copy of the purchase order on which the quantity ordered is not shown. Consequently it is necessary for him to make an independent determination of the quantity received, which it is believed by those that use the plan avoids the error of accepting materials, without weighing or measuring, on the basis of the amount called for on the purchase order. In any event, the one responsible for receiving materials should be expected accurately to verify the quantities received. On the matter of inspection, small plants may lay down a simple procedure for inspection by the stores clerk. In larger plants there may be a separate inspection department in the factory organization, with one inspector assigned solely for checking the quality of the materials received. This is a desirable plan where it can be worked out economically. Under such a plan the inspector is provided with a copy of the standard



specification for the material and compares the material received with this standard specification.

**DISBURSEMENTS.**—Materials are disbursed from store on the basis of an authorized requisition. Under the most complete plans such a requisition is authorized and perhaps prepared by the planning department. In fact, the planning control may be so precise that the stores clerk receives the requisition and disburses the material at the precise moment when it is needed in the manufacturing department and the material is delivered to the particular machine on which the work will be done. In other instances, where such close production control is not in effect or desired, the requisition is prepared by the foreman of the department needing the material. Whatever the precise plan is in use the storekeeper does not disburse material without some sort of an authorized requisition.

With respect to the delivery of materials, two plans are in use. In one the stores department is responsible for the actual delivery of the material to the machine or place in the factory department where it is needed. In the other, employees of the factory department call at the store for the material. Local conditions govern so greatly in connection with this feature that it is not wise to lay down any one practice as the best.

Materials should be disbursed from store in the exact quantities requisitioned. Sometimes attempts have been made to allow factory employees to withdraw more material than is required for the order with the expectation of return of the unused balance. This is a dangerous and usually unnecessary procedure. Cold rolled shafting, for example, may be used in the company's product. Different lengths are needed. In such a case the store may be provided with a hack saw or other equipment for the cutting of the shafting to the exact length needed.

**RECORD-KEEPING.**—Perpetual inventory records are kept in various ways. Some prefer loose leaf books of the ledger type. Many others employ a perpetual inventory record card in sizes varying between 5" x 8" and 8½" x 11". The use of bookkeeping machines is being extended to the maintenance of perpetual inventory records to good advantage.

Work on the perpetual inventory record must be careful and correct. Neat records make for accuracy. Inaccurate records are costly. With figures in different columns, errors in addition and subtraction on perpetual inventory cards are easily made and especial care should be used to avoid them.

There is the necessity for a constant or periodical check of actual quantities of material on hand with the balance figures

shown on the perpetual inventory record. This is accomplished in various ways which will be described later.

### COST ACCOUNTING

One essential of worthwhile cost accounting is the reliable control of materials. Whatever may be the cost plan in use, job costs, operation costs, class costs, or predetermined or standard costs, this control of material is necessary.

The store room is a reservoir. Into it are fed the raw materials of various kinds and quantities that will be needed for production. Like a water supply reservoir, the quantity put in cannot exactly equal the amount taken out. There must be a reserve supply. To carry the analogy a little further, the use of water is carefully metered and those who use it pay in proportion to the amount used. So it must be with raw materials. Each job, or operation, or factory department (depending upon the cost plan) must be held strictly accountable for the materials it receives and uses.

This control is secured through a requisition system, the main points of which have already been touched upon. For each withdrawal of material there is an authorization and the quantities supplied are those required for production. This means that there is neither more nor less given out than will be needed. Of course, cases arise when difficulties are experienced and faulty work occurs. At such times additional material will be required, but the requisition plan will provide here for authorization for the delivery of additional material and the job orders or the departments involved will be properly charged. Thus costs are accurately obtained.

Stores control is of even greater importance from an accounting point of view in connection with the plan for the preparation of periodical statements of profit and loss and balance sheets for the business as a whole. Reverting again to the illustration of the reservoir, the company's investment in materials corresponds to the water supply held impounded in the reservoir. How much is there in this reservoir? When materials are purchased the investment put into the reservoir is thus made known. But unless the amount withdrawn is metered (through the requisition system) the amount left in the reservoir is indeterminate except when a physical check or inventory is taken. So it is highly important, if a monthly profit and loss statement is to be prepared without the usually impractical plan of taking an actual inventory at the end of each month, to cost the requisitions of materials withdrawn from stock. These requisitions

in a sense correspond with meter readings and the total of these meter readings represents the value of raw materials withdrawn from the reservoir. Thus it is an easy matter to obtain the exact value of the inventories of raw materials left in stock. The simple formula is as follows:

The value of materials in stores at the beginning of a month plus purchases during the month, less withdrawals from store at cost equals the balance of materials in store at the end of the month.

This procedure provides a definite value for the only otherwise indeterminate asset the company possesses. Thus the balance sheet values are obtained and its complement—the profit and loss statement—is prepared.

#### VERIFYING THE PERPETUAL INVENTORY

As has already been suggested, it is necessary and desirable to verify the figures as shown by the perpetual inventory records with the actual balances of stock on hand. This is accomplished in one of several ways. Some companies make it a practice to require that the storekeeper show on each requisition that he fills the balance of the stock remaining on hand after filling the requisition. This requisition going to the perpetual inventory clerk enables him to check his balances with the balances as reported by the stock clerk. Oftentimes this method, however, is not a practical one because of the thousands of items involved and the inability of the stores clerk to determine the balance on hand without going to the labor of making an actual count or of weighing the material remaining in stock. The plan does seem to be of value, however, in the case of certain items which must be watched especially closely.

Another plan is to have the stock clerk check the balances of a few items each day, recording the quantities found on a special form, which then goes to the perpetual inventory clerk for verification with the perpetual inventory record.

Some check the actual balances against the perpetual inventory balances whenever a requisition for purchase of a new supply is made. This plan has merit in many instances.

A few companies make a complete check of all items in stock against perpetual inventory records semiannually. This plan does not seem to be as good as one of the others, for errors accumulate and discrepancies are not found sometimes until months after they occur.

In order to give more completely the plan which is followed somewhat generally, the following is quoted from the practices of the Union Special Machine Company of Chicago:

1. We accept our ledger accounts as of December 31 in any year as correct and as our inventory as of December 31; therefore no inventory is taken at that time.

2. In order that we may know that the ledger accounts and therefore our inventory is correct, the following procedure is employed during the year:

(a) Each month throughout the year a portion of our bins is checked against the corresponding inventory cards for overages, shortages, obsolescence, overstocks and over or under valuations. Any discrepancies are corrected by correcting entries to both inventory cards and ledger control accounts. These entries are made on the date the discrepancy is discovered. This checking is done at a rate which insures that every card is checked at least once in each year.

(b) Each month sections of the inventory cards included in one ledger control account are totaled and correcting entries made to the control for the difference, if any, between the sum of the inventory cards and the ledger control. This totaling is done at a rate to insure that all sections are totaled at least once in each year, in addition to totaling described under (c).

(c) Starting November 1, all sections of the inventory cards are totaled against the control, in the month of November and correcting entries made to the control for any differences between total of cards and ledger control of cards.

(d) An auditing section reporting directly to the general manager assumes the responsibility of spot-checking and notifying the general manager if inventories are not correct.

This procedure has the following advantages:

1. Our balance sheet is correct every month in respect to values of inventories instead of only being correct at the end of the year. As we issue a monthly balance sheet and income statement, this is of importance.

2. There is no delay in closing books at the end of the year due to inventories.

3. There is a correct valuation of inventories since we found it practically impossible to take a correct in-



ventory at the end of the year. It appears to take continuous work during the year to get correct inventories.

4. There is an absence of large correcting entries in the month of December.

5. We avoid misstatements of profits during the year, due to over or under valuation of inventories.

### THE YEARLY CLOSING

The inventory values play an important part in the yearly closing of the accounts of a manufacturing company and in the preparation of its income tax returns. Before the day of the perpetual inventory and stores control it was vitally necessary to close the plant for as much time as would be necessary completely to count and check the materials and stocks on hand. The perpetual inventory and modern stores control have made this unnecessary. In the first place, the perpetual inventory record checked from time to time with actual stocks on hand provides a dependable record of the quantities. In the second place, modern stockkeeping methods are such as to assist in making this perpetual inventory reliable. In fact, some companies have reported that they are satisfied that their perpetual inventory values at the end of their fiscal year are more reliable than the results of a physical inventory.

Even with the best organization and the most comprehensive checks on a physical inventory, the work is crowded into the last few days of the fiscal year and some errors are almost inevitable.

Where a reliable perpetual inventory plan is in use, the year end finds much more constructive activities going on. Perhaps the plant is closed for a day or two at the most. Very frequently the work about to be described can be done in a half day or even without cessation of productive operations.

Possibly 30 days before the close of the fiscal year, inventory sheets are prepared. On these sheets in rotation appear all of the items for which there are perpetual inventory stock cards. These items are listed according to some form or other of classification. Sometimes a classification by character of material is employed. In other cases classification by the type of product in which the material is used is determined upon. Provisions for the pricing of the closing inventory are started. Where the "cost or market, whichever is lower" plan is in effect, the matter of the unit prices to be employed for each material has been taken up. The perpetual inventory stock clerk has

reviewed all of his stock cards and marked for attention those items which appear to present irregularity or peculiarity.

The year end, therefore, finds the plant that has adopted this program ready for the final check-up. Items of material or manufactured parts that are possibly obsolete are examined and decision reached as to their inclusion in the inventory. Shop-worn materials and parts are investigated. The productive departments are cleaned up and thorough check made of all work in process. Odd items of material—found in nearly every plant—which have strayed from stores, or the order to which they were charged, are returned to stores. In short, the year end presents an excellent opportunity to clean house and prepare for a new start in the new year.

The situation just described is emphasized by the writer of a recent article\* on the subject, who has said:

“There is in our plant, as I presume there is in most, each year an accumulation of slow stock, odd lengths, obsolete castings, material made obsolete by changes in design, and so on.

“We start an investigation of all these. I recall, for example, one year before we got as thoroughly organized as we are now, it was discovered that we had carried on the previous year’s inventory, as good stock, upwards of \$25,000 worth of castings which apparently were absolutely obsolete. These were carried at full cost price, whereas they were worth—most of them—not a cent more than their value as scrap iron. But the problem in reality was not as quickly solved as that. Should we take the entire lot and send them to the scrap heap and melt them over? Natural prudence indicated otherwise. So a careful investigation was conducted, as a result of which many, many items were actually sent to the scrap pile. In other cases 50 per cent of the stock was sent there; the remainder of these were considered salable within a reasonable time. Again, we kept 10 per cent of the stock of one casting, and so on through the entire list.”

### PLANT EFFICIENCY

The perpetual inventory is an indicator in many directions of the efficiency of plant operation. From the perpetual inventory stock record cards summaries of various kinds can be prepared for the executives to show such things as the varieties

\* “The Inventory as a Tool of Management,” *Factory Magazine*, January, 1924. Page 33.

of materials carried (with the prospect of simplification of this variety), the inventory values for various groups of materials, the average monthly use of materials of various kinds, and so on.

Some companies carry on their general books of accounts a number of inventory controlling accounts so that monthly on their balance sheets they are made aware of the condition of inventory values in the various lines of materials and manufactured parts.

The perpetual inventory is also of value to the plant manager in a very great number of ways. For example, quoting again from the article above mentioned:

“One year we had a quantity of channels and I-beams on hand that it was proposed be inventoried at the market price, which was then lower than our cost. But the channels and I-beams were of odd lengths. They were not worth as much to us as they would have been had they been standard lengths, nor would they bring the market price anywhere.

“A special price, of course, had to be made, but of greater interest is the fact that it caused us to look into the matter carefully as to whether it would not pay us to buy our channels and I-beams in the lengths we used, thereby eliminating odd lengths altogether. Surely investigations arising from the pricing of inventories make inventory taking more than of value for its original purpose.”

Again, the perpetual inventory and stores control assist in keeping down the number of designs developed by the engineering department. In the same article is the following statement:

“Our engineering department is always on its toes to perfect the designs of our product and unfortunately it sometimes improves its design without taking into account its effect on inventory values. Parts are re-designed with the result that both the new part and the old must be kept in stock. Up go the inventory values. At other times parts are absolutely superseded even though considerable quantities of the old design are in stock and might be used up. Down goes our profit for the year, for when we inventory such an item we have to include it at scrap value.

“All of this has led to the establishment of a definite and fixed routine before engineering design is changed. When such a change is proposed the engineering department makes out a statement of the pro-





posed change and submits it to everyone concerned. Stocks of the parts about to be made obsolete are investigated and reported upon. Sometimes even we have to go back of that and see whether we have purchased a special raw material for the items about to be made obsolete. For example, we use various brass rods with different alloy content and it might entail a loss to have a stock of special alloy left on hand."

### FORMS

While forms are an essential part of any system of control, and this is true of perpetual inventory and stores control, too much emphasis can be placed on their importance. In this pamphlet but brief reference is made to them. Some of the forms that are employed are the following:

Requisition for Purchase	Return to Stores
Purchase Order	Scrap Credit
Bin Tag	Perpetual Inventory Form
Stores Requisition	Perpetual Inventory Test

The use of these various forms has already been described or indicated. Of these there are but two or three which are of sufficient interest to reproduce. On page 19 will be found a "Sample Form of Perpetual Inventory." On page 23 appears a "Detailed Perpetual Inventory Form." The "Perpetual Inventory Test Form" is shown on page 25.

### FOREMEN AND WORKMEN

To a large degree the success of the perpetual inventory and stores control system will depend on thorough cooperation. Foremen and workmen have important places in the successful functioning of the system. Occasions will arise which offer the greatest temptation to avoid established procedure and to resort to the old practice of helping one's self. Foremen must realize that the overstepping of regular procedure (even though onerous at times) will inevitably lead to confusion and difficulty.

In particular the foreman can help directly by avoiding congestion in his department, by protecting materials in his charge against breakage and theft, by supervising the distribution of materials to his workmen, by ascertaining that the correct number of finished pieces are produced from the quantity of material drawn, by seeing that the material is skillfully handled so that unnecessary scrap will not result; and when processed that the work is promptly and properly transferred again to store or the next succeeding department.



The foreman will prevent the irregular accumulation of material in his department. He will know that any such accumulation will inevitably be discovered at the end of the fiscal year and its finding operate against him in the eyes of the management.

Workmen and foremen alike will exercise care and restraint in the use of what are known as expense supplies, such as brooms, files, wiping waste, electric bulbs, and so on. The little expenses, inconsequential in themselves, amount to considerable sums in the aggregate. With a proper perpetual inventory and stores control system in effect the efficient foreman will be known for the care which he uses in connection with such items. The losses due to the inefficient foreman and his workmen will surely be revealed.

In short, stores control goes further than the bounds of the storeroom. Stores control is in reality factory control and the plant manager, every department head and every workman has a share in carrying it on.

#### CONCLUSION

It is the experience of this Department in its contact with many industries that there has been much good work accomplished in the control of material in factories. There has appeared to be a tendency, however, on the part of some to go to excessive refinement. The prime function of a factory is to manufacture, to which all else must contribute. Systems of control, of which stores control is one, must be maintained to secure the best results. But such systems should not be overly elaborate. There is a point of development that will give the most effective results at the least outlay for operation, and it is the hope that this pamphlet by suggestion will assist many to find this point.

The Department of Manufacture welcomes correspondence from anyone interested and concerned in the development of stores control systems, for it is largely through the interchange of experiences in the use of such systems that improvements may be made.

E. W. McCULLOUGH,  
*Department Manager.*

THOMAS W. HOWARD,  
*In Charge, Cost Accounting.*

## DEPARTMENT OF MANUFACTURE

### (Fabricated Production Department)

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*Single copies of these publications will be furnished on request, without charge.*