COMMODITY ALLOCATING SYSTEM, COMMODITY ALLOCATING METHOD, COMMODITY ALLOCATING PROGRAM, AND STORING MEDIUM

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a commodity allocating system, a commodity allocating method, a commodity allocating program, and a storing medium, in particular, to those for pre-designating a recipient for commodities that will be received so as to effectively distribute the commodities.

Description of the Related Art

Fig. 1 is a schematic diagram describing a conventional commodity distributing system 101.

The commodity distributing system 101 is mainly composed of a shipment area 102, a storage area 103, and a recipient zone 104.

The shipment area 102 is an area from which commodities are shipped for example a warehouse of a manufacturer for finished commodities or a warehouse for commodities landed at a port.

The storage area 103 is a base for storage of commodities unloaded from a warehouse. The storage area 103 is composed of a replenishment base disposed in a rear portion thereof and a commodity center disposed in a front portion thereof.

The recipient zone 104 is a recipient of

commodities for example a volume retailer or a small retailer that sells commodities to consumers or a whole seller.

In such a commodity distributing system 101, commodities are distributed in the following manner.

Commodities are shipped from the shipment area 102 in expectation and stocked in a replenishment base.

On the other hand, when a recipient of the recipient zone 104 puts an order for commodities, the storage area 103 determines whether or not the commodity center has the ordered commodities. When the commodity center has the ordered commodities, it sends them to the recipient. Thereafter, the commodity center gets commodities from the replenishment base so as to replenish them.

When the commodity center does not have the ordered commodities, it asks the replenishment base about the ordered commodities. When the replenishment base has the ordered commodities, the commodity center sends them to the recipient through the replenishment base.

When the replenishment base does not have the ordered commodities, the storage area 103 puts an order for the ordered commodities to a manufacturer.

As an invention for effectively distributing commodities, a supply chain management system has been

disclosed.

[Patent Related Art Reference 1]

Japanese Patent Laid-Open Publication No. 2003-48621

According to the invention, estimated finished commodity demand information is generated in accordance with real sales information supplied from distributors. In accordance with the estimated finished commodity demand information, part suppliers are asked for part shipment deadlines. A finished commodity shipment deadline is estimated with replies from the part suppliers and the distributors are informed of the finished commodity shipment deadline.

As an invention for informing a customer of a shipment deadline, a commodity sales apparatus has been disclosed.

[Patent Related Art Reference 2]

Japanese Patent Laid-Open Publication No. 2002-24352

According to the invention, before accepting an order for commodities from a customer, it is informed of the shipment deadline thereof. When the customer has given the order, the ordered commodities are automatically delivered to it with the informed shipment deadline.

In the commodity distributing system 101, commodities shipped from the shipment area 102 are

temporarily stored in the storage area 103. When an order is received from the recipient zone 104, the commodities stored in the storage area 103 are shipped. Thus, deliveries of commodities are not scheduled. In addition, since cargo trucks that deliver commodities should be designated in each delivery base, cargo trucks may not be fully loaded or return cargo trucks may be empty. As a result, in the commodity distributing system 101, there is a loss of delivery cost.

SUMMARY OF THE INVENTION

Therefore, embodiments of the present invention seek to provide a commodity allocating system that allows commodities to be effectively delivered in accordance with a schedule.

Example embodiments can provide a commodity allocating system for pre-allocating commodities to a customer with a shipment schedule of a predetermined commodity type in a predetermined future period, comprising possible quantity designating means for designating possible order quantity information that represents a quantity of the commodities that the customer can order to allocation limit information designated to the customer; allocation limit information storing means for storing allocation limit information to which the possible order quantity information has been

designated; ordered quantity obtaining means for obtaining an ordered quantity from an ordering customer that order the commodities; allocating means for allocating the obtained ordered quantity of the permissible order quantity to the ordering customer with the possible order quantity information of allocation limit information designated to the ordering customer; and updating means for updating possible order quantity information of the allocation limit information with the allocated quantity (known as a first structure).

In the first structure, the allocation limit storing means is configured to store hierarchical relation information that represents a hierarchical relation of the allocation limit information and the other allocation limit information, wherein the allocation limit information in the lowest hierarchical level is directly designated to the customer, wherein allocation limit information in other than the lowest hierarchical level is designated to the customer through allocation limit information in lower hierarchical levels, and wherein the allocating means is configured to allocate allocation limit information designated to the ordering customer to the ordered quantity in the order of the lower hierarchical levels (known as a second structure).

In the second structure, the commodity

allocating system further comprises estimated sales quantity calculating means for calculating an estimated sales quantity of the commodities in the predetermined period for each dealer, wherein the possible quantity designating means is configured to decide possible order quantity information for the allocation limit information with the estimated sales quantity of each dealer to which the ordering customer belongs (known as a third structure).

In the second structure, the commodity allocating system further comprises presenting means for presenting possible order quantity information designated to the allocation limit information, wherein a range of allocation limit information for possible order quantity information is designated for each presentee presented by the presenting means (known as a fourth structure).

In the fourth structure, the presentee is designated to allocation limit information in the lowest hierarchical level, wherein the range of the presentable allocation limit information is allocation limit information having a hierarchical relation with the allocation limit information in the lowest hierarchical level designated to the presentee (known as a fifth structure).

In the fifth structure, the hierarchical relation has a higher lever presentation prohibition

region, wherein the presentable allocation limit information is restricted at the higher layer presentation prohibition region (known as a sixth structure).

In the second structure, the hierarchical structure of the allocation limit information is designated for each commodity type (known as a seventh structure).

Example embodiments can provide a commodity allocating method for pre-allocating commodities to a customer with a shipment schedule of a predetermined commodity type in a predetermined future period, the method being accomplished by a computer having possible quantity designating means, allocation limit information storing means, ordered quantity obtaining means, allocating means, and updating means, the method comprising the steps of causing the possible quantity designating means to designate possible order quantity information that represents a quantity of the commodities that the customer can order to allocation limit information designated to the customer; causing the allocation limit information storing means to store allocation limit information to which the possible order quantity information has been designated; causing the ordered quantity obtaining means to obtain an ordered quantity from an ordering customer that order the commodities; causing the allocating means to allocate the obtained ordered quantity of the permissible order quantity to the ordering customer

with the possible order quantity information of allocation limit information designated to the ordering customer; and causing the updating means to update possible order quantity information of the allocation limit information with the allocated quantity (known as an eighth structure).

In the eighth structure, the allocation limit storing step is performed by causing the allocation limit storing means to store hierarchical relation information that represents a hierarchical relation of the allocation limit information and the other allocation limit information, wherein the allocation limit information in the lowest hierarchical level is directly designated to the customer, wherein allocation limit information in other than the lowest hierarchical level is designated to the customer through allocation limit information in lower hierarchical levels, and wherein the allocating step is preformed by causing the allocating means to allocate allocation limit information designated to the ordering customer to the ordered quantity in the order of the lower hierarchical levels (known as a ninth structure).

In the ninth structure, the computer also has estimated sales quantity calculating means, wherein the method further comprises the step of causing the estimated sales quantity calculating means to calculate an estimated sales quantity of the commodities in the

predetermined period for each dealer, wherein the possible quantity designating step is performed by causing the possible quantity designating means to decide possible order quantity information for the allocation limit information with the estimated sales quantity of each dealer to which the ordering customer belongs (known as a tenth structure).

In the ninth structure, the computer also has presenting means, wherein the method further comprises the step of causing the presenting means to present possible order quantity information designated to the allocation limit information, wherein a range of allocation limit information for possible order quantity information is designated for each presentee presented at the presenting step (known as an eleventh structure).

In the eleventh structure, the presentee is designated to allocation limit information in the lowest hierarchical level, wherein the range of the presentable allocation limit information is allocation limit information having a hierarchical relation with the allocation limit information in the lowest hierarchical level designated to the presentee (known as a twelfth structure).

In the twelfth structure, the hierarchical relation has a higher lever presentation prohibition region, wherein the presentable allocation limit information is restricted at the higher layer

presentation prohibition region (known as a thirteenth structure).

In the ninth structure, the hierarchical structure of the allocation limit information is designated for each commodity type (known as a fourteenth structure).

Example embodiments can provide a commodity allocating program that causes a computer to accomplish the functions of pre-allocating commodities to a customer with a shipment schedule of a predetermined commodity type in a predetermined future period; designating possible order quantity information that represents a quantity of the commodities that the customer can order to allocation limit information designated to the customer; storing allocation limit information to which the possible order quantity information has been designated; obtaining an ordered quantity from an ordering customer that order the commodities; allocating the obtained ordered quantity of the permissible order quantity to the ordering customer with the possible order quantity information of allocation limit information designated to the ordering customer; and updating possible order quantity information of the allocation limit information with the allocated quantity (known as a fifteenth structure).

In the fifteenth structure, the allocation limit storing function is performed by storing hierarchical relation information that represents a

hierarchical relation of the allocation limit information and the other allocation limit information, wherein the allocation limit information in the lowest hierarchical level is directly designated to the customer, wherein allocation limit information in other than the lowest hierarchical level is designated to the customer through allocation limit information in lower hierarchical levels, and wherein the allocating function is performed by allocating allocation limit information designated to the ordering customer to the ordered quantity in the order of the lower hierarchical levels (known as a sixteenth structure).

In the sixteenth structure, the program causes the computer to further accomplish the function of calculating an estimated sales quantity of the commodities in the predetermined period for each dealer, wherein the possible quantity designating function is performed by deciding possible order quantity information for the allocation limit information with the estimated sales quantity of each dealer to which the ordering customer belongs (known as a seventeenth structure).

In the sixteenth structure, the program causes the computer to further accomplish the function of presenting possible order quantity information designated to the allocation limit information, wherein a range of allocation limit information for possible

order quantity information is designated for each presentee presented by the presenting function (known as an eighteenth structure).

A first aspect of the present invention provides a commodity allocating program that causes a computer to accomplish the functions of: pre-allocating commodities to a customer with a shipment schedule of a predetermined commodity type in a predetermined future period; designating possible order quantity information that represents a quantity of the commodities that the customer can order to allocation limit information designated to the customer; storing allocation limit information to which the possible order quantity information has been designated; obtaining an ordered quantity from an ordering customer that order the commodities; allocating the obtained ordered quantity of the permissible order quantity to the ordering customer with the possible order quantity information of allocation limit information designated to the ordering customer; updating possible order quantity information of the allocation limit information with the allocated quantity; presenting possible order quantity information designated to the allocation limit information, wherein a range of allocation limit information for possible order quantity information is designated for each presentee presented by the presenting function; wherein the presentee is designated to allocation limit information in the lowest hierarchical level, and wherein the range of the presentable allocation limit information is allocation limit information having a hierarchical relation with

the allocation limit information in the lowest hierarchical level designated to the presentee.

The hierarchical relation may have a higher lever presentation prohibition region, wherein the presentable allocation limit information is restricted at the higher layer presentation prohibition region.

The hierarchical structure of the allocation limit information may be designated for each commodity type.

Example embodiments can provide a computer readable storing medium in which a commodity allocating program is stored, the commodity allocating program causing the computer to accomplish the functions of pre-allocating commodities to a customer with a shipment schedule of a predetermined commodity type in a predetermined future period; designating

possible order quantity information that represents a quantity of the commodities that the customer can order to allocation limit information designated to the customer; storing allocation limit information to which the possible order quantity information has been designated; obtaining an ordered quantity from an ordering customer that order the commodities; allocating the obtained ordered quantity of the permissible order quantity to the ordering customer with the possible order quantity information of allocation limit information designated to the ordering customer; and updating possible order quantity information of the allocation limit information with the allocated quantity (known as a twenty second structure).

In the twenty second structure, the allocation limit storing function is performed by storing hierarchical relation information that represents a hierarchical relation of the allocation limit information and the other allocation limit information, wherein the allocation limit information in the lowest hierarchical level is directly designated to the customer, wherein allocation limit information in other than the lowest hierarchical level is designated to the customer through allocation limit information in lower hierarchical levels, and wherein the allocating function is performed by allocating allocation limit information designated to the ordering

customer to the ordered quantity in the order of the lower hierarchical levels (known as a twenty third structure).

In the twenty third structure, the program causes the computer to further accomplish the function of calculating an estimated sales quantity of the commodities in the predetermined period for each dealer, wherein the possible quantity designating function is performed by deciding possible order quantity information for the allocation limit information with the estimated sales quantity of each dealer to which the ordering customer belongs (known as a twenty fourth structure).

In the twenty third structure, the program causes the computer to further accomplish the function of presenting possible order quantity information designated to the allocation limit information, wherein a range of allocation limit information for possible order quantity information is designated for each presentee presented by the presenting function (known as a twenty fifth structure).

In the twenty fifth structure, the presentee is designated to allocation limit information in the lowest hierarchical level, wherein the range of the presentable allocation limit information is allocation limit information having a hierarchical relation with the allocation limit information in the lowest hierarchical level designated to the presentee (known as a twenty

sixth structure).

In the twenty sixth structure, the hierarchical relation has a higher lever presentation prohibition region, wherein the presentable allocation limit information is restricted at the higher layer presentation prohibition region (known as a twenty seventh structure).

In the twenty third structure, the hierarchical structure of the allocation limit information is designated for each commodity type (known as a twenty eighth structure).

According to the embodiments of the present invention, since commodities can be delivered in accordance with a schedule, the distribution cost of commodities can be reduced.

These and other advantages of example embodiments will become more apparent in light of the following detailed description of a best mode embodiment thereof, as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic diagram describing a conventional commodity distributing system.

Fig. 2 is a schematic diagram showing an example of a structure of a commodity distributing system according to an embodiment of the present invention.

Fig. 3 is a schematic diagram showing an example of a structure of a management center.

Fig. 4 is a schematic diagram showing an example of a sales estimation screen.

Fig. 5 is a schematic diagram showing an example of an allocation limit structure.

Fig. 6A to Fig. 6D are schematic diagrams describing movement of allocated quantities that are used up.

Fig. 7 is a schematic diagram describing an example of a hierarchical structure of a plurality of allocation limit structures.

Fig. 8 is a flow chart describing an allocation process.

Fig. 9 is a flow chart describing a use-up process.

Fig. 10A and Fig. 10B are schematic diagrams describing shipment deadlines.

Fig. 11A and Fig. 11B are schematic diagrams describing shipment deadlines.

Fig. 12A and Fig. 12B are schematic diagrams describing shipment deadlines.

Fig. 13 is a schematic diagram describing a method for calculating a deadline.

Fig. 14 is a flow chart describing a use-up process using shipment deadlines.

Fig. 15A to Fig. 15C are schematic diagrams

describing a reuse-up process.

Fig. 16A and Fig. 16B are schematic diagrams describing a method for a reuse-up process of an allocation limit management and use-up system.

Fig. 17 is a flow chart describing a reuse-up process.

Fig. 18 is a schematic diagram describing a future allocation limit.

Fig. 19 is a schematic diagram describing a structure of a computer disposed in a management center.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

(Outline of Embodiment)

A management center 5 (see Fig. 2) estimates a necessary production quantity of commodities for each type on weekly basis using a sale estimating system and informs a manufacturer of the estimated necessary production quantity. The manufacturer creates a production schedule for commodities so that it satisfies the estimated quantity (estimated value) and informs the management center 5 of a shipment quantity. When commodities are received by the management center 5, they can be delivered.

Before informed commodities are received, the management center 5 allocates them to recipients.

An allocated quantity of commodities is an upper limit value of which the management center 5 can

accept an order for commodities from a customer (such as a retailer). The management center 5 decides an allocated quantity in accordance with an estimated sales quantity of each region, priority of each customer, and a ratio designated for each customer.

The allocated quantities are hierarchically structured so that the management center 5 can flexibly accept orders from customers (see Fig. 5). Commodities are allocated to customers that place orders upwardly from the lowest hierarchical level.

The management center 5 concentratively designates cargo trucks that deliver commodities from warehouses to recipients.

Each warehouse is designated a shipment deadline for each delivery direction. Cargo trucks depart on daily fixed time basis. Cargo trucks take pre-designated transportation routes, transship cargoes at transshipment bases, and deliver cargos to recipients.

Time periods for which cargo trucks pass through transportation routes are pre-estimated. Shipment deadlines are designated so that cargo trucks can meet at transshipment bases.

Each cargo truck transships a cargo at a transshipment base and delivers the cargo to a recipient.

Since times at which commodities are

delivered from warehouses and time periods necessary for delivery for commodities are pre-estimated, the customers can be accurately informed of shipment deadlines of commodities.

In addition, the management center 5 allocates scheduled commodities to orders from customers on hourly basis.

The management center 5 receives an hourly production schedule from a manufacturer and knows a scheduled quantity (see Fig. 10).

The management center 5 receives an ordered quantity and a requested shipment deadline from a customer and designates the latest shipment deadline that satisfies the requested deadline and allocates scheduled commodities to the customer for the ordered quantity in the direction of which time is traced back from the shipment deadline namely in the direction of the present time.

Since the latest scheduled commodities that satisfy a requested deadline are allocated to a customer, even if an order having a short shipment deadline is received from a customer, the order can be accepted. As a result, commodities can be effectively allocated in accordance with a production schedule.

Conventionally, commodities that were produced are allocated to orders of customers. However, according to the present embodiment, scheduled

commodities that have not been produced are allocated to customers. As a result, commodities can be effectively distributed.

(Detailed Description of Embodiment)

Fig. 2 is a schematic diagram showing an example of a structure of a commodity distributing system 1 according to the embodiment of the present invention. The commodity distributing system 1 is a system that distributes home electric appliances for example digital cameras, video recorders, stereo components, and so forth to dealers.

The commodity distributing system 1 is composed of a reference shipment area 2, a distributor area 3, a recipient zone 4, and a management center 5.

The reference shipment area 2 is a group of centralized shipment bases such as warehouses of manufacturers of commodities and warehouses for commodities produced in foreign countries and landed so that transportation lead times to the distributor area 3 become the same.

Fig. 2 shows only one reference shipment area 2. However, actually, there are a plurality of reference shipment areas 2 for each area of the country, for example, Tokyo area, Cyukyo area, and so forth).

The distributor area 3 is an area having a predetermined frontline base that delivers commodities.

The distributor area 3 has a group of commodity delivery areas.

In Fig. 2, only one distributor area 3 is shown. However, actually, there are a plurality of distributor areas 3 corresponding to areas of the country, for example, a wide metropolitan area, which includes Kanto, Yamanashi, Nagano, and Niigata and Cyubu area.

The distributor area 3 has transshipment bases at which a cargo is transshipped from one cargo truck to another cargo truck. A cargo of a cargo truck is transshipped from one cargo truck to another cargo truck under the control of the management center 5 and the transshipped cargo is delivered to another transshipment base or a recipient.

The recipient zone 4 is a group of recipients for commodities so that transportation lead times of commodities from the distributor area 3 become the same.

In Fig. 2, only one recipient zone 4 is shown. However, in reality, there are a plurality of recipient zones 4.

Recipients are for example stores of volume retailers for home electronic appliances, distribution centers, independent retailers for home electronic appliances, and whole sellers for home electronic appliances.

The management center 5 is an organization that concentratively manages distribution of commodities of the commodity distributing system 1 so that commodities are delivered from the reference shipment area 2 to the recipient zone 4 without delay.

The management center 5 estimates sales and a production quantity of commodities and informs a manufacturer of the estimated production quantity of commodities. Thus, the management center 5 requests a manufacturer to produce commodities before accepting an order for commodities from a customer.

Customers in the commodity distributing system 1 are buyers who buy commodities produced by a manufacturer under the control of the management center 5. The buyers are for example small retailers and volume retailers. When a manufacturer directly sells commodities to consumers, they are customers.

A manufacturer creates a production schedule on hourly basis in accordance with the estimated quantity supplied from the management center 5.

The management center 5 can know a scheduled shipment quantity of commodities on hourly basis in accordance with the production schedule.

In addition, the management center 5 designates a shipment deadline of a warehouse, a transportation route of a cargo truck, and transshipment at a transshipment base for the scheduled

commodities. Normally, the shipment deadline and the transportation route are fixed.

A time period for which a cargo truck travels is pre-estimated. Shipment deadlines are designated so that cargo trucks meet at a transshipment base.

To deliver commodities in accordance with a schedule, it is preferred that when they are shipped their recipient should have been designated.

To do that, the management center 5 performs two information processes "allocation process using an allocation limit structure" and "deadline management using shipment deadlines".

The "allocation process using allocation limit structure" is an information process for pre-allocating scheduled commodities produced on weekly basis to a customer in accordance with an estimated sales quantity. The "deadline management using shipment deadlines" is an information process for effectively allocating scheduled commodities that are shippable on hourly basis in accordance with a customer's requested deadline. As will be described later, sales limit information that is hierarchically defined is designated to customers.

Before these information processes are described, terms used therein will be defined.

"Allocated quantity" is an upper limit of a quantity of commodities for which an order from a

customer can be accepted.

For example, assuming that the allocated quantity of customer A is 10 commodities and the allocated quantity of customer B is 5 commodities, an order for up to 10 commodities from customer A can be accepted; an order for up to 5 commodities from customer B can be accepted.

"Allocation" is to designate an allocated quantity to a customer.

For example, assuming that 10 commodities and 5 commodities are allocated to customer A and customer B, allocated quantities thereof are 10 commodities and 5 commodities, respectively.

According to the present embodiment, commodities are allocated to allocation limits using a hierarchical allocation limit structure that will be described later.

"Use-up" is to use up an ordered quantity from an allocated quantity designated for a customer in accordance with a predetermined use-up rule when an order from a customer is accepted.

For example, assuming that an order for 3 commodities is received from a customer to which 10 commodities are allocated, 3 commodities are used up from the allocated quantity of 10 commodities. As a result, the allocated quantity becomes 7. Thereafter, the customer can put an order of 7 commodities.

In other words, a customer has a right for putting an order for commodities by an allocated quantity.

Namely, a customer has a right for securing scheduled commodities by an allocated quantity. By using up the allocated quantity, the customer can secure commodities (that have not yet produced) for the ordered quantity.

Next, with reference to Fig. 3, a system structure of the management center 5 will be described.

The system structure shown in Fig. 3 is only an example. The system of the management center 5 may be accomplished by one server device. Alternatively, the system of the management center 5 may be accomplished by a combination of a plurality of server devices.

The management center 5 comprises a sales estimating system 7, an allocation limit management and use-up system 8, and an order receiving system 9.

As systems corresponding to the reference shipment area 2, the distributor area 3, and the recipient zone 4, Fig. 3 also shows a manufacturer's system 12, a transporter's system 13, and a dealer's system 14. These systems can communicate with the system of the management center 5 through a network.

The sales estimating system 7 is a system that estimates a sales quantity of commodities for each

commodity type.

The sales estimating system 7 estimates a sales quantity on weekly basis and informs the allocation limit management and use-up system 8 and the manufacturer's system 12 of the estimated quantity.

The sales estimating system 7 stores past sales record data for each commodity type and estimates a sales quantity using a statistical method.

The sales estimating system 7 can estimate a total sales quantity from various stand points such as each region and each dealer.

Since an estimated quantity calculated by the sales estimating system 7 does not always come true, a person in charge (hereinafter, sometimes referred to as operator) can correct the estimated quantity in accordance with real situation. The sales estimating system 7 can be accomplished by known software.

The sales estimating system 7 informs the manufacturer's system 12 of an estimated total sales quantity. The manufacturer creates a production schedule in accordance with the estimated total sales quantity and informs the allocation limit management and use-up system 8 of the production schedule. The production schedule contains a scheduled reception quantity on hourly basis.

The allocation limit management and use-up system 8 performs "allocation process using allocation

limit structure" and "deadline management using shipment deadlines" and allocates and uses up scheduled commodities.

The allocation limit management and use-up system 8 allocates scheduled commodities to a customer in accordance with the estimated sales quantity obtained from the sales estimating system 7 and the scheduled quantity obtained from the manufacturer's system 12.

The allocation limit management and use-up system 8 obtains customer's order data from the order receiving system 9, uses up the ordered quantity from the commodities allocated to the customer, and informs the order receiving system 9 of the used-up result.

The order data contains information that identifies a customer, information that identifies ordered commodity type, an ordered quantity, a requested deadline, and so forth.

In addition, the allocation limit management and use-up system 8 obtains stock information from the transporter's system 13 and informs the transporter's system 13 of a shipment request and a shipment schedule in accordance with the stock information, the used-up result, and the allocated result.

The order receiving system 9 receives customer's order data from the dealer's system 14 and supplies the order data to the allocation limit

management and use-up system 8. The allocation limit management and use-up system 8 obtains a used-up result for the order from the allocation limit management and use-up system 8.

An order is normally received from the dealer's system 14 through a network such as the Internet. Alternatively, an order may be received through a telephone, a facsimile, or the like. An accepted order is stored as order data.

The order receiving system 9 calculates a deadline of the order in accordance with the used-up result and informs the dealer's system 14 of the calculated deadline.

Fig. 4 is a schematic diagram showing an example of a sales estimation screen provided by the sales estimating system 7.

A person in charge of sales estimation (hereinafter sometimes referred to as operator) can obtain various types of estimated quantities on the sales estimation screen displayed on a display device.

An estimation area field 21 is used to designate an area for which a commodity sales quantity is estimated. The operator can select one from pre-designated areas indicated in the estimation area field 21.

In the estimation area field 21, the operator can select an range of areas for which a commodity

sales quantity is estimated from for example whole country, Kanto area, Chiyoda ward, and so forth. Alternatively, in the estimation area field 21, the operator can select a customer from for example "OX Camera Store" and "OO Company".

In addition, in the estimation area field 21, the operator can estimate a sales quantity of each customer and each region by logically adding a customer and an area for example "OX Camera Store" AND "Chiyoda Ward".

A commodity type field 22 is used to designate a type of commodities. In the commodity type field 22, the operator can select one of pre-designated commodity types such as "digital camera", "handycam", "television", and so forth.

A model field 23 is used to select a commodity number corresponding to the commodity type designated in the commodity type field 22.

When the commodity type field 22 and the model field 23 are designated, a commodity type to be estimated can be designated.

When the model field 23 is not designated, an estimated sales quantity of all models of the commodity type designated in the commodity type field 22 is obtained.

An estimated quantity display field 24 indicates real sales records of up to the preceding

week and estimated sales quantities after the present week. Estimated sales quantities after the present week are underlined.

An "estimated sales quantity" field indicates values that an estimating module of the sales estimating system 7 calculates with parameters of past sales records and other values.

The estimated sales quantities are calculated by a statistical calculation process. The operator can use the estimated sales quantities as a guideline for estimating a real sales quantity.

A "real sales quantity" field indicates estimated real sales quantities designated in accordance with the estimated quantities in the "estimated sales quantity" field.

The operator can correct the estimated sales quantities. The estimated sales quantities can be affected by a decision of the operator.

A "market inventory quantity" field indicates quantities of commodities that are stocked or will be stocked on the market. Entries of the market stock quantity after the present week indicate estimated quantities. The operator can also correct these estimated quantities.

A "shipped quantity" field indicates shipped quantities on the market. Entries of the field "shipped quantity" after the present week are estimated

quantities.

The estimated quantities can be calculated by formula "(stocked quantity on the market in the present week) - (stocked quantity on the market in the last week) + (real sales quantity in the present week)".

In the example shown in Fig. 4, the shipped quantity in the present week is 5,204 = 15,377 - 11,640 + 1,467.

When the operator changes values of the "real sales quantity" field and the "market stocked quantity" field, values of the "shipped quantity" field are updated in accordance with the changed values thereof.

In the example shown in Fig. 4, since the estimated area field 21 is "whole country", the shipped quantity 26 in the present week is the quantity of "digital camera model ABC1234" shipped from the manufacturer.

The sales estimating system 7 sends these values to the manufacturer's system 12 of the manufacturer of the digital cameras. The manufacturer can designate target production quantities of the digital camera model.

The sales estimating system 7 calculates quantities of individual commodity types in the present week and the following weeks and transmits the calculated quantities to the manufacturers of the commodity types.

[Allocation Process Using Allocation Limit Structure]

Next, an allocation process using an allocation limit structure will be described. The allocation process using an allocation limit structure is performed by the allocation limit management and use-up system 8.

Fig. 5 is a schematic diagram showing an example of an allocation limit structure that the allocation limit management and use-up system 8 uses to allocate commodities to customers.

An allocation limit structure is created for each commodity type on weekly basis. An allocation limit structure 30 shown in Fig. 5 shows an allocation limit structure of digital cameras of model ABC12345 in a particular week.

The allocation limit structure 30 is formed in a memory space of a computer that composes the sales estimating system 7. The allocation limit structure 30 can be displayed on a display device or the like.

A storing device of the computer composes allocation limit information designating means.

As shown in Fig. 5, the allocation limit structure 30 is defined as a hierarchical structure of allocation limit names and allocated quantities.

A hierarchical relation of the hierarchical structure is defined by a plurality of hierarchical levels and a plurality of allocation limit names that

belong to one of the hierarchical levels. At least one allocation limit name in a particular hierarchical level belongs to one allocation limit name in the immediately higher hierarchical level.

In the example shown in Fig. 5, the highest hierarchical level has an allocation limit name "top". The allocated quantity of the allocation limit name "top" is 0. Hereinafter, an allocation limit name "top" is abbreviated as allocation limit "top".

Immediately below the allocation limit "top" (hierarchical level 1), there are allocation limits "customer companies", "other companies", and "special companies" and their allocated quantities are 0 each.

Immediately below the allocation limit "customer companies" (hierarchical level 2), there are allocation limits "Edo Electric" and "Long Camera" and their allocated quantities are 50 and 30, respectively.

Immediately below the allocation limit "Edo Electric" (hierarchical level 3), there is an allocation limit "Osaka Branch" and the allocated quantity is 15.

Immediately below the allocation limit "Osaka Branch" (hierarchical level 4), there is an allocation limit "Umeda Sales Office" and the allocated quantity is 45.

According to the present embodiment, allocation limits are designated in accordance with a

hierarchical structure of customers. Alternatively, allocation limits and a hierarchical relation may be designated regardless of a business form of customers.

These allocation limits are designated to customers. In other words, allocation limits in the lowest hierarchical level are directly designated to customers. Allocation limits in a higher hierarchical level than the lowest hierarchical level are designated to customers through allocation limits in lower hierarchical levels.

For simplicity, a single customer is designated to one allocation limit in the lowest hierarchical level. Alternatively, a plurality of customers may be designated to one allocation limit in the lowest hierarchical level.

A customer can use up allocated quantities designated thereto upwardly from the lower hierarchical level.

For example, a customer 33a can use up an allocated quantity of 45 of the allocation limit "Umeda Branch" (in other words, the customer 33a can use up a maximum of 45 commodities). After the customer 33a has used up all an allocated quantity of 45 of the allocation limit "Umeda Branch", the customer 33a can use up an allocated quantity of 15 of the allocation limit "Osaka Branch" in the higher hierarchical level.

A customer 33b and a customer 33c are

designated to the allocation limit "Long Camera" in the hierarchical level 2. After the customer 33b and the customer 33c have used up the allocation limits in the hierarchical levels 3 and 4, the customer 33b and the customer 33c can use up an allocated quantity of the allocation limit "Long Camera".

What customer uses up the allocated quantity of the allocation limit "Long Camera" depends on use-up states of allocated quantities in the lower hierarchical levels. In other words, a customer who has used up an allocated quantity in a lower hierarchical level has right to use up the allocated quantity of the allocation limit "Long Camera".

With such a rule of which allocated quantities are used up upwardly from the lowest hierarchical level, a customer can be prevented from using up an allocated quantity in a higher hierarchical level skipping intermediate hierarchical levels and monopolizing commodities.

The allocation limit structure 30 also has higher search prohibition regions 32, 32, and so forth. The higher search prohibition region 32 composes a higher hierarchical level presentation prohibition region.

The higher search prohibition region 32 represents both an upper limit of an allocation limit that a customer can use up and an upper limit of a

search range designated to a customer.

A customer accesses the management center 5 from a terminal unit of a company and searches lower hierarchical levels than the higher search prohibition region 32 in an allocation limit designated to the customer. As a result, the customer can know allocated quantities designated to these allocation limits.

For example, allocation limits "Edo Electric", "Osaka Branch", and "Umeda Sales Office" compose a search range. The customer 33a can search each allocation limit with a terminal unit. However, the customer 33a cannot search the allocation limit "customer companies" that is a higher hierarchical level than the higher search prohibition region 32 and other allocation limits such as the allocation limit "Long Camera".

Although a customer can search allocation limits upwardly from a low hierarchical level, not downwardly from a high hierarchical level.

For example, the customer 33b can reference allocation limits upwardly from for example an allocation limit "Sapporo Sales Office" to an allocation limit "Hokkaido Branch" to the allocation limit "Long Camera", not downwardly from the allocation limit "Long Camera" to an allocation limit "Tokyo Branch".

This is because a business entity that has

large capital such as a volume retailer is prevented from cornering the market. In addition, information of which how many commodities a business entity has bought is a sales secret. In addition, designation of an allocated quantity of commodities of each business entity relates to sales strategy of a commodity supplier. Thus, it may not be preferred to publish the entire allocation limit structure.

Next, with reference to Fig. 6A to Fig. 6D, a use-up method using an allocation limit structure will be practically described.

Fig. 6A shows an allocation limit "A Camera" and an allocation limit "A Camera Hokkaido" that are placed in a higher hierarchical level and a lower hierarchical level, respectively.

Now, it is assumed that a customer "A Camera Retailer" designated to the allocation limit "A Camera Hokkaido" places an order with the management center 5 for one commodity.

In this case, the allocation limit management and use-up system 8 checks an allocated quantity of the allocation limit "A Camera Hokkaido" in the lowest hierarchical level designated to the customer "A Camera Retailer" and determines whether or not one commodity can be used up to the "A Camera Retailer".

In this case, the allocation limit management and use-up system 8 uses up one of two commodities

allocated to the allocation limit "A Camera Hokkaido" for the customer "A Camera Retailer" because the allocated quantity of the allocation limit "A Camera Hokkaido" is two commodities.

Fig. 6B shows an allocation limit structure after one commodity has been used up. The allocated quantity of the allocation limit "A Camera Hokkaido" has been updated to 1 (= 2 - 1).

Fig. 6C is a schematic diagram showing an allocation limit structure in the case that the allocated quantity of the allocation limit "A Camera Hokkaido" is 0.

In this state, it is assumed that the management center 5 accepts an order for one commodity from the customer "A Camera Retailer".

In this case, the allocation limit management and use-up system 8 checks the allocated quantity of the allocation limit "A Camera Hokkaido". In this case, since the allocated quantity of the "A Camera Hokkaido" is 0, the allocation limit management and use-up system 8 does not use up a commodity for the order. Thereafter, the allocation limit management and use-up system 8 checks the allocated quantity of the allocation limit "A Camera" in the higher hierarchical level. In this case, since the allocated quantity of the allocation limit "A Camera" is 10, the allocation limit management and use-up system 8 uses up one of 10

commodities for the customer "A Camera Retailer".

Fig. 6D shows an allocation limit structure of which the allocation limit management and use-up system 8 has used up the allocated quantity of the allocation limit "A Camera" and updated it to 9 (= 10 - 1).

When the allocation limits are hierarchically structured, there are following benefits.

Allocated quantities of higher hierarchical levels are shared by customers in lower hierarchical levels. The allocated quantities can be used up for customers depending on orders that they have placed.

In other words, when commodities are hierarchically allocated with a hierarchical structure, the difference between an estimated sales quantity and a real ordered quantity can be absorbed by allocated quantities in higher hierarchical levels.

Since estimated sales quantities in urbanized areas such as Kanto area and Cyukyo area are large, the difference between an estimated sales quantity and an ordered quantity becomes small.

On the other hand, in an area whose sales quantity is small such as Uchisaiwaicho, Chiyoda Ward, since the sales quantity is small, the difference between an estimated quantity and an ordered quantity becomes large.

Thus, the lower a hierarchical level, the

smaller the number of customers designated to an allocation limit is. As a result, since the difference between an estimated quantity and an ordered quantity becomes large, it becomes difficult to accurately estimate a sales quantity.

To solve such a problem, quantities that absorb such a difference are allocated in allocation limits in higher hierarchical levels so as to absorb the difference that takes place in a lower hierarchical level with an allocated quantity in a higher hierarchical level.

For example, it is assumed that the estimated sales quantity of the allocation limit "A Region" is 3 commodities and the estimated sales quantity of the allocation limit "B Region" is 2 commodities. Thus, it is assumed that 1 commodity is allocated to the allocation limit "A Region" and the allocation limit "B Region" each, that an allocation limit "C Region" is placed above the allocation limits "B Region" and "A Region", and that 3 commodities are allocated to the allocation limit "C Region".

In such conditions, when the ordered quantity of the allocation limit "A Region" is 2 commodities and the ordered quantity of the allocation limit "B Region" is 3 commodities, 1 of 3 commodities allocated to the allocation limit "C Region" replenishes the allocation limit "A Region" and 2 of 3 commodities allocated to

the allocation limit "C Region" replenish the allocation limit "B Region".

In such a manner, the allocated quantities can be corrected in only the allocation limits "A Region" and "B Region" and the allocation limit "C Region" immediately above those allocation limits in the entire allocation limit structure.

When the allocation limits are not hierarchically structured, each allocation limit is designated to a small number of customers. As a result, if the allocated quantity is insufficient, it is necessary to search allocation limits that have excessive allocated quantities and reallocate an excessive allocated quantity to an allocation limit that does not have a sufficient quantity. Thus, the process becomes complicated and ineffective.

In the foregoing, the case of which there is only one allocation limit structure was described. However, as shown in Fig. 7, a plurality of allocation limit structures can be hierarchically structured.

In Fig. 7, an allocation limit structure 36 as a lower hierarchical level belongs to an allocation limit "Kanto Branch" of an allocation limit structure 35. An allocation limit structure 37 as a lower hierarchical level belongs to an allocation limit "Tokyo Branch" of the allocation limit structure 36.

In such a plurality of allocation limit

structures, allocated quantities are used up upwardly from the lowest hierarchical level.

When a used-up quantity is larger than the allocated quantity of the allocation limit "Tachikawa Sales Office" of the allocation limit structure 37, an insufficient quantity may be replenished with the allocation limit "Top" immediately above the allocation limit "Tachikawa Sales Office". If the insufficient quantity cannot be replenished with the allocation limit "top", the insufficient quantity may be replenished with the "Tokyo Branch" of the allocation limit structure 36 immediately above the allocation limit "top".

This operation is repeated until the insufficient quantity is replenished or until the higher search prohibition region 32 is searched.

Fig. 8 is a flow chart describing a process of the allocation limit management and use-up system 8 that designates an allocated quantity.

The allocation limit management and use-up system 8 performs the process in accordance with a predetermined program.

First of all, a counter i that counts the number of commodity types is initialized to 0 (at step 5).

Thereafter, a scheduled reception quantity for the i-th commodity type is obtained (at step 10).

This process is performed by ordered quantity obtaining means of the allocation limit management and use-up system 8.

The scheduled reception quantity as the allocated quantity is input to the allocation limit structure for the commodity type (at step 15). This process is performed by possible quantity designating means of the allocation limit management and use-up system 8.

The allocated quantity is designated in accordance with an estimated sales quantity of each region, priority of each customer, a ratio designated for each customer, and so forth. Alternatively, the allocated quantity may be designated by another method. When necessary, the operator can adjust the allocated quantity.

If there is a small region for which a sales quantity cannot be estimated, the operator can adjust the allocated quantity of such a region.

Thereafter, it is determined whether or not allocated quantities for all commodity types have been designated (at step 20).

When there is a commodity type for which an allocated quantity has not been designated (the determined result at step 20 is No), the counter is incremented by 1 (at step 25). Thereafter, the flow returns to step 10.

After all allocated quantities have been designated for all the commodity types (the determined result at step 20 is Yes), the allocation process is completed.

Fig. 9 is a flow chart describing the use-up process using an allocation limit structure.

The allocation limit management and use-up system 8 performs the process in accordance with a predetermined program.

First of all, an ordered quantity is obtained from a customer (at step 50). This process is performed by order quantity obtaining means of the allocation limit management and use-up system 8.

Thereafter, an allocation limit designated to the customer is designated. It is determined whether or not the allocated quantity of the allocation limit is sufficient for the ordered quantity (at step 55).

When the allocated quantity is sufficient for the ordered quantity (the determined result at step 55 is Yes), the ordered quantity is used up from the allocated quantity. This process is performed by allocating means of the allocation limit management and use-up system 8.

The allocated quantity of the allocation limit is updated (= value before ordered quantity has not been used up - used-up quantity) (at step 75). Thereafter, the process is completed. This updating

process is performed by updating means of the allocation limit management and use-up system 8.

When the allocated quantity is insufficient from the ordered quantity (the determined result at step 55 is No), it is determined whether or not the allocation limit in the immediately higher hierarchical level can be referenced (at step 60).

When the allocation limit in the immediately higher hierarchical level cannot be referenced because of a higher search prohibition region (the determined result at step 60 is No), the ordered quantity is not used use or all the allocatable quantity is used up. Thereafter, the process is completed.

When the allocation limit in the immediately higher hierarchical level can be referenced (the determined result at step 60 is Yes), the allocated quantity in the immediately higher hierarchical level is checked (at step 65).

Thereafter, it is determined whether or not the allocation limit has an allocated quantity that can replenish the insufficient quantity (at step 70). When the allocated quantity is insufficient (the determined result at step 70 is No), the flow returns to step 60. At step 60, an allocated quantity of an allocation limit in the immediately higher hierarchical level is searched.

When the allocated quantity is sufficient

(the determined result at step 70 is Yes), the allocated quantity is used up from the allocation limit. The allocated quantity of the allocation limit is updated with the used-up quantity (at step 75). Thereafter, the process is completed.

The use-up process using the allocation limit structure has the following effects.

(1) When ordered commodities of a customer are used up, an allocated quantity as an upper limit of a used-up quantity can be designated in an allocation limit structure in which allocation limits for customers are hierarchically structured.

(2) Since recipients of commodities that will be received can be pre-designated using the allocation limit structure, cargo trucks can be pre-allocated in accordance with a schedule.

(3) Since cargo trucks can be allocated and cargos can be transshipped in accordance with a schedule, it is not necessary to store commodities in the distributor area 3. Thus, the cargo trucks can transship cargos in the distributor area 3 and deliver the cargos to the recipients.

(4) Allocated quantities of allocation limits are used up upwardly from the lowest hierarchical level designated to a customer. Thus, when a used-up quantity is larger than an allocated quantity, an allocated quantity of an allocation limit

in a higher hierarchical level can be used up.

(5) When a higher search prohibition region is placed in an allocation limit structure, allocation limits that can be searched from the outside can be restricted to a pre-designated range. Thus, a micro management or a macro management for allocation limits can be selected in accordance with a demand situation of commodities without need to change an allocation limit structure of allocation limits.

(6) An allocated quantity of an allocation limit can be automatically designated with a scheduled reception quantity in accordance with a pre-designated ratio, an estimated sales quantity, and so forth.

(7) Since an allocation limit structure is designated for each commodity type, customers can be segmented in accordance with commodity types. Thus, sales strategy can be delicately applied to orders from customers. In addition, allocated quantities can be designated in accordance with characteristics of commodities.

[Deadline Management Using Shipment deadlines]

Next, a deadline management process using shipment deadlines will be described. The deadline management process is performed by the allocation limit management and use-up system 8.

When the use-up process is performed with an allocation limit structure, quantities that can be used

up are designated in accordance with allocated quantities. In contrast, when the use-up process is performed with shipment deadlines, shipment deadlines of commodities that are used up with an allocation limit structure are designated.

In other words, an allocation limit structure is created on weekly basis. A produced quantity in that week is allocated to an allocation limit structure.

However, assuming that 1000 commodities are produced in that week, commodities are produced on daily basis for example 100 commodities are produced on the first day, 200 commodities are produced on the second day, and so forth. Thus, although commodities are allocated in the same allocation limit structure, commodities produced early are delivered early to customers.

Thus, when a concept of shipment deadlines is employed, customers can be informed of accurate shipment deadlines of commodities that will be received (that have not yet received).

In detail, production schedule data (reception schedule) is received from a manufacturer on hourly basis. Likewise, shipment deadlines are received from a manufacturer on hourly basis.

When a scheduled reception quantity is used up for an order from a customer, the scheduled

reception quantity and a shipment deadline are compared. A commodity that has the latest shipment deadline that satisfies the customer's requested deadline is used up. This is defined as one use-up rule.

Next, this process will be described in detail.

In the present embodiment, it is assumed that commodities are delivered from a warehouse by cargo trucks to recipient zones on around daily basis.

Fig. 10A is a schematic diagram showing an example of a timetable of cargo trucks that depart from a particular warehouse.

It is assumed that cargo trucks depart from the warehouse for Kyusyu region (northern island of Japan) and Honsyu (main island of Japan) region on daily basis.

Although the departing times of the cargo trucks are not always fixed, for simplicity, it is assumed that they depart on time on daily basis.

The timetable composes shipment schedule information that contains possible shipment start time, possible shipment quantity, and shipment deadline for each recipient region of commodities. The timetable is transmitted from the manufacturer's system 12 (shipment schedule information obtaining means) to the allocation limit management and use-up system 8. The allocation

limit management and use-up system 8 stores the timetable.

It is assumed that the daily shipment deadline for the Kyushu region is 12:00 and the daily shipment deadline for Kyusyu region is 14:00.

In addition, it is assumed that the warehouse now stocks 24 commodities, that scheduled reception quantities of shippable commodities are 25 commodities at 9:00 on April 1, 25 commodities at 13:00 on the same day, 25 commodities at 15:00 on the same day, 75 commodities at 9:00 on April 2, 75 commodities at 13:00 on the same day, and so forth.

In such a manner, the manufacturer's system 12 informs the management center 5 of a shipment schedule on hourly basis.

It is assumed that the present time is at 8:00 on April 1 and an order of 50 commodities is received from a customer that is a dealer of Honsyu region (see Fig. 10B).

In addition, it is assumed that the latest shipment deadline for Honsyu region that satisfies the customer's requested deadline is at 14:00 on April 1. At that point, the allocation limit management and use-up system 8 performs a use-up process for scheduled commodities with the shipment deadline as a reference point.

When the latest shipment deadline for Honsyu

region that satisfies the customer's requested deadline is at 14:00 on April 2, the allocation limit management and use-up system 8 performs a use-up process for scheduled commodities with a reference point of 14:00 April 2.

Since the use-up process is performed with a reference point of the latest shipment deadline that satisfies the customer's requested deadline, if another customer places an order with a short deadline, the possibility of which commodities can be used up for the later customer becomes high.

Thereafter, the allocation limit management and use-up system 8 searches scheduled reception quantities from the reference point to the present time and uses up the scheduled quantities for the ordered quantity in the direction of which time is traced back from the reference point.

Assuming that an ordered quantity is 50 commodities, a scheduled reception quantity of 25 commodities that is closest to the reference point (14:00, April 1) is used up for the customer. In addition, time is traced back from the reference point and a scheduled reception quantity of 25 commodities (9:00, April 1) is used up for the customer.

In such a manner, the allocation limit management and use-up system 8 uses up 50 commodities for the customer in the direction of which time is

traced back from the reference point.

Assuming that an ordered quantity from a customer is 60 commodities, time is further traced back and 10 of 25 stocked commodities are used up for the customer.

Fig. 11A is a schematic diagram describing another example of the use-up process.

Now, it is assumed that an order of 150 commodities is received from a dealer of Honsyu region and that the latest shipment deadline that satisfies the requested deadline is at 14:00 on April 1.

However, in this case, even if time is traced back from a reference point of the shipment deadline (14:00, April 1), a scheduled reception quantity of 150 commodities cannot be secured.

Thus, the allocation limit management and use-up system 8 tries to secure commodities with a reference point of the next shipment deadline that is closest to the customer's requested deadline (14:00, April 2).

First of all, the allocation limit management and use-up system 8 secures a scheduled reception quantity of 75 commodities (13:00, April 2) that is closest to the reference point (14:00, April 2). Next, the allocation limit management and use-up system 8 secures a scheduled reception quantity of 75 commodities (9:00, April 2) that is next closest to the

reference point. As a result, the allocation limit management and use-up system 8 uses up a total of 150 commodities for the customer.

In this case, although the real deadline is delayed by around one day from the customer's requested deadline, the deadline closest to the user's desired deadline can be secured. Thus, the user's request can be maximally satisfied. The allocation limit management and use-up system 8 informs the customer of the secured deadline.

Fig. 11B is a schematic diagram describing an example of the case that a scheduled reception quantity that has been used up is tried to be used up.

It is assumed that an order of 150 commodities is received from a customer (a dealer of Honsyu region). Like the case shown in Fig. 11A, the allocation limit management and use-up system 8 tries to secure scheduled commodities with a reference point of 14:00, April 2.

However, in this case, it is assumed that a scheduled reception quantity of 75 commodities (13:00, April 2) that is closest to the reference point has been used up for another customer.

Thus, the allocation limit management and use-up system 8 does not use up the scheduled reception quantity for the former customer, but a scheduled reception quantity that is next closest to the

reference point.

In such a manner, commodities are used up in the order of arrival. This is defined as one use-up rule.

The allocation limit management and use-up system 8 secures a total of 150 commodities of scheduled reception quantities of 75 commodities (9:00, April 2), 25 commodities (15:00, April 1), and so forth that have not been used up in the direction of which time is traced back from the reference point and uses up the secured commodities for the customer.

Next, with reference to Fig. 12A, an example of which stocked commodities are used up will be described.

Now, it is assumed that an order of 50 commodities is received from a dealer of Kyusyu region as a customer. Assuming that the latest shipment deadline that satisfies the customer's requested deadline is at 12:00 on April 1, the allocation limit management and use-up system 8 tries to secure commodities with a reference point of the shipment deadline and use up them for the customer.

First of all, the allocation limit management and use-up system 8 secures a scheduled reception quantity of 25 commodities (9:00, April 1) that is closest in the direction of which time is traced back from the reference point.

Thereafter, the allocation limit management and use-up system 8 further traces back time from the reference point and secures 25 commodities that are presently stocked.

The allocation limit management and use-up system 8 uses up a total of 50 commodities for the customer.

Thus, the allocation limit management and use-up system 8 can use up commodities that are presently stocked.

Next, with reference to Fig. 12B, an example of the case that an order of 150 commodities is received from a customer will be described.

The allocation limit management and use-up system 8 tries to secure commodities with a reference point of a shipment deadline at 12:00 on April 1. However, the allocation limit management and use-up system 8 can secure only 50 commodities. Thus, the allocation limit management and use-up system 8 designates a shipment deadline (12:00, April 2) that is next closer to the present time, not the shipment deadline at 12:00 on April 1.

The allocation limit management and use-up system 8 secures scheduled reception quantities of 150 commodities that have not been used up in the direction of which time is traced back from the reference point and uses up the secured commodities for the customer.

In this case, since the allocation limit management and use-up system 8 can secure scheduled reception quantities of 150 commodities from 9:00, April 2 to 9:00, April 1, the allocation limit management and use-up system 8 does not need to use up 25 commodities that are presently stocked.

Fig. 13 is a schematic diagram describing a method for calculating a deadline.

It is assumed that commodities are taken out from a warehouse and that they are delivered from the reference shipment area at 15:00 on April 1. It is assumed that three hours later, the commodities will be transshipped at a transshipment base to another cargo truck, that further 12 hours later, the commodities will be transshipped to another cargo truck, and that further four hours later, the commodities will arrive at a recipient. In other words, a total of lead time is 19 (= 3 + 12 + 4) hours.

The allocation limit management and use-up system 8 pre-stores a delivery time period for each transportation route. With the stored delivery time periods, the allocation limit management and use-up system 8 can calculate shipment deadlines.

In such a manner, the allocation limit management and use-up system 8 has required time period calculating means.

The foregoing shipment deadlines are simply

calculated. The allocation limit management and use-up system 8 calculates shipment deadlines in consideration of various conditions such as holidays of a manufacturer, a holidays of a transporter, required transshipment time periods of cargo trucks, and holidays of a customer.

When a customer does not designate its requested shipment deadline, the allocation limit management and use-up system 8 designates the date of order as customer's requested shipment deadline.

Fig. 14 is a flow chart describing a use-up process using shipment deadlines.

The allocation limit management and use-up system 8 performs the use-up process in accordance with a predetermined program.

First of all, order data is transmitted from the dealer's system 14 (see Fig. 3) to the order receiving system 9. The order receiving system 9 supplies the order data to the allocation limit management and use-up system 8. The allocation limit management and use-up system 8 stores the order data. In such a manner, the allocation limit management and use-up system 8 has order receiving means.

The allocation limit management and use-up system 8 extracts a commodity type, an ordered quantity, a requested deadline, and so forth from the order data (at step 100).

Thereafter, the allocation limit management and use-up system 8 designates the latest shipment deadline that satisfies the requested deadline in accordance with the commodity reception schedule (at step 105). The use-up process is performed with a reference point of the commodity reception schedule. This process is performed by shipment deadline selecting means of the allocation limit management and use-up system 8.

Thereafter, the allocation limit management and use-up system 8 searches scheduled commodities (that have not been used up) from the designated shipment deadline to the present time namely in the direction of which time is traced back and secures the ordered quantity (at step 110).

This process is performed by searching means of the allocation limit management and use-up system 8.

Thereafter, the allocation limit management and use-up system 8 determines whether or not the ordered quantity has been secured (at step 115). When the ordered quantity has been secured (the determined result at step 115 is Yes), the allocation limit management and use-up system 8 uses up the secured scheduled commodities for the customer (at step 120). Thereafter, the process is completed.

The use-up process is performed by allocating means of the allocation limit management and use-up

system 8.

In contrast, when the ordered quantity has not been secured (the determined result at step 115 is No), the allocation limit management and use-up system 8 designates the next shipment deadline, namely a shipment deadline that is later than the shipment deadline designated at step 110 and that is closest to the present time (at step 125). Thereafter, the flow returns to step 110. This process is repeated until the ordered quantity has been used up for the customer.

In addition, the allocation limit management and use-up system 8 has a database that correlatively stores customers and commodities allocated thereto. After the allocation limit management and use-up system 8 has performed the use-up process, it updates the database (allocation information storing means).

According to the present embodiment, a logic that allows an order from a customer to be optimally allocated to a production schedule and a loss of business opportunity to be minimized is provided. When the use-up process is executed in a lump, a control system that prevents used-up results from becoming inconsistent is accomplished.

[Reuse-up process]

Next, a reuse-up process will be described.

A manufacturer informs the management center 5 of a shipment schedule on hourly basis. Commodities

delivered from the manufacturer may be delayed due to a trouble, a change of a holiday, maintenance and inspection of facility, and so forth.

When a reception of commodities is delayed and a reception schedule is changed, the management center 5 performs a reuse-up process with the latest information and calculates a changed shipment deadline.

When a shipment deadline is delayed, the management center 5 can re-calculate the shipment deadline on real time basis and inform the customer of the changed shipment deadline.

Next, the case of which a reception of commodities is delayed will be described. Likewise, in the case of which a reception of commodities is moved forward, the shipment deadline can be re-calculated.

Fig. 15A shows a shipment schedule of a particular manufacturer.

At present time (8:00, April 1), it is assumed that a total of 50 commodities of a scheduled reception quantity of 25 commodities at 9:00 on April 1, and a scheduled reception quantity of 25 commodities at 13:00 on April 1 have been used up for a customer and they will be received at 14:00 on April 1.

However, as shown in Fig. 15B, it is assumed that the commodities have not been received at present time, at 14:30 on April 1, and they have not been received at the shipment deadline at 14:00 on April 1.

In addition, it is assumed that the manufacturer has informed the management center 5 of a shipment change that represents that the scheduled reception quantity of 50 commodities from the manufacturer has been delayed and will be delivered at 15:00 on April 1.

The allocation limit management and use-up system 8 of the management center 5 receives the message and starts the reuse-up process.

First of all, the allocation limit management and use-up system 8 adds a scheduled reception quantity of 25 commodities at 9:00 on April 1, a scheduled reception quantity of 25 commodities at 13:00 on April 1, and a scheduled reception quantity of 50 commodities at 15:00 on April 1. Thus, the scheduled reception quantity at 15:00 on April 1 becomes 100 commodities.

In such a manner, the allocation limit management and use-up system 8 updates the reception schedule with the latest information received from the manufacturer.

Thereafter, as shown in Fig. 15C, the allocation limit management and use-up system 8 uses up 50 commodities (scheduled reception at 14:00 on April 2) for the order from the customer with a reference point at 14:00 on April 2 that is a shipment deadline closest to the present time (at 14:30 on April 1) in the direction of which time is traced back from the

reference point. In such a manner, the allocation limit management and use-up system 8 performs the reuse-up process with the updated reception schedule.

In addition, the allocation limit management and use-up system 8 re-calculates a shipment deadline with the updated reception schedule.

As described above, according to the present embodiment, when the reception schedule is changed, the schedule table is updated with the latest information and the reuse-up process is performed with the updated schedule table. The shipment deadline is re-calculated and the customer is informed of the latest deadline.

When a reception schedule is changed, the shipment deadline can be re-calculated on real time basis. As a result, orders from customers can be quickly handled.

Fig. 16A and Fig. 16B are schematic diagrams describing a reuse-up process preformed by the allocation limit management and use-up system 8.

It is assumed that there is a commodity group of commodity A, commodity B, commodity C, and so forth. The allocation limit management and use-up system 8 manages a use-up process for all the commodity group.

The allocation limit management and use-up system 8 can perform a reuse-up process for each commodity type. Thus, when a reception schedule of commodity A is changed, the allocation limit management

and use-up system 8 performs a reuse-up process for only commodity A, not other commodity types as shown in Fig. 16A.

While the allocation limit management and use-up system 8 is performing the reuse-up process for a commodity, the system 8 cannot reply to an inquiry against the shipment deadline thereof. Thus, the allocation limit management and use-up system 8 cannot receive an order from a customer.

While the allocation limit management and use-up system 8 is performing the reuse-up process for commodity A, the system 8 cannot reply to an inquiry about the shipment deadline of commodity A, but other commodity types.

Fig. 16B shows an example of which a reuse-up process is performed for all commodity types. Since a system that performs a reuse-up process for all commodity types is much simpler than a system that performs a reuse-up process for each commodity type, the structure of the former is simple. Thus, the system is structured at low cost and can be easily employed.

However, in the system shown in Fig. 16B, even if a reception schedule of a part of commodity types is changed, a reuse-up process should be performed for all commodity types. Thus, the system cannot reply to an inquiry about a shipment deadline

for a long time. During such a time period, the system cannot accept a new order from a customer.

It is assumed that the time period necessary for the reuse-up process per commodity type is one minute and the number of commodity types is 1000.

Now, when a reception schedule for one commodity type is changed, the allocation limit management and use-up system 8 shown in Fig. 16A cannot reply to an inquiry against the shipment deadline for the commodity type for one minute.

On the other hand, when the system shown in Fig. 16B performs the reuse-up process, it cannot reply to an inquiry against shipment deadlines for all commodity types for 1000 minutes (around 16 hours).

Thus, a business entity that employs the system shown in Fig. 16B should perform the reuse-up process at night. Consequently, the system cannot reply to an inquiry about the latest shipment deadlines on real time basis.

Fig. 17 is a flow chart describing a reuse-up process.

The allocation limit management and use-up system 8 performs the process in accordance with a predetermined program.

First of all, the allocation limit management and use-up system 8 designates one of commodity types to perform the reuse-up process (at step 200). This

process is performed by shipment schedule information designating means of the allocation limit management and use-up system 8. The shipment schedule information designating means designates shipment schedule information that contains changed information.

Thereafter, the allocation limit management and use-up system 8 updates a reception schedule of the commodity type with latest information received from the manufacturer (at step 205).

This process is performed by shipment schedule information updating means.

Thereafter, the allocation limit management and use-up system 8 performs the use-up process with the updated reception schedule (at step 210). The use-up process is the same as that shown in Fig. 14. This process is performed by re-allocating means.

Thereafter, the allocation limit management and use-up system 8 determines whether or not there is a commodity type to perform the reuse-up process (at step 215).

When there is a commodity type to perform the reuse-up process (the determined result at step 215 is Yes), the flow returns to step 200. At step 200, the allocation limit management and use-up system 8 performs the reuse-up process for the commodity type.

When there is no commodity type to perform the reuse-up process (the determined result at step 215

is No), the reuse-up process is completed.

[Future Allocation Limit Process]

Next, with reference to Fig. 18, a future allocation limit process will be described.

When a manufacturer produces commodities, it sometimes produces a large number of commodities in a lump to reduce the production cost.

Thus, a sales quantity that the sales estimating system 7 (see Fig. 3) estimates on weekly basis may be different from a quantity that the manufacturer produces.

As shown in Fig. 18, it is assumed that the manufacturer will produce 200 commodities each in 25-th week and 27-th week.

On the other hand, it is assumed that the sales estimating system 7 has estimated weekly sales of 100 commodities. Such a difference takes place because the sales estimating system 7 has estimated weekly sales of 100 commodities and the manufacturer will produce 200 commodities in a lump to reduce the production cost.

In this case, the allocation limit management and use-up system 8 divides 200 commodities produced in the 25-th week into two sets of 100 commodities and allocates the first set and the second set to the 25-th week and the 26-th week, respectively.

Likewise, the allocation limit management and

use-up system 8 divides 200 commodities produced in the 27-th week into two sets of 100 commodities and allocates the first set and the second set to the 27-th week and the 28-th week, respectively.

As a result, the estimated sales quantities satisfy the allocated quantities.

In such a manner, the management center 5 informs the manufacturer of estimated sales quantities several weeks ahead. On the other hand, the manufacturer can produce commodities in a lump so that the total produced quantity of commodities satisfies the total estimated sales quantity.

The allocation limit management and use-up system 8 shifts the possible shipment quantities of commodities produced in a lump and allocates them so that the estimated sales quantity satisfies the total allocated quantity.

This process is performed by shifting means of the allocation limit management and use-up system 8.

The shipment deadline management using shipment deadlines has the following effects.

(1) A delivery schedule of a manufacturer can be obtained on hourly basis.

(2) Since a production schedule contains time information, finished commodities can be very quickly shipped. Thus, orders from customers can be accepted with a small quantity of stocked commodities.

(3) Since shipment deadlines are designated in accordance with departure times of cargo trucks, ordered commodities can be used up with a reference point of the shipment deadlines.

(4) A customer can be informed of an accurate deadline for an order in accordance with shipment deadlines and lead times.

(5) Since the reuse-up process is performed for each commodity type, the reuse-up process can be performed in a short time. Thus, it is not necessary to stop receiving orders.

(6) Since the reuse-up process is performed in a short time, when an reception schedule is changed, the reuse-up process can be performed on real time basis in accordance with the latest information.

(7) Since the reuse-up process can be performed on real time basis, when a reception schedule is changed, the customer can be informed of a changed deadline.

Next, with reference to Fig. 19, a structure of a computer disposed in the management center 5 will be described.

The computer is composed of for example a personal computer or a workstation.

The management center 5 comprises a controlling portion 66, an input device 74, an output device 78, a communication controlling device 82, a

storing device 88, a storing medium driving device 76, and an input/output interface 84 as peripheral devices that are connected through a bus line 73.

The bus line 73 transmits and receives control signals and data signals transmitted and received between the controlling portion 66 and the peripheral devices.

The controlling portion 66 performs information processes necessary for commodity distribution such as a sales estimation process, an allocation limit management process, a use-up process, and so forth.

The controlling portion 66 comprises a central processing unit (CPU) 68, a ROM (Read Only Memory) 70, and a RAM (Random Access Memory) 72.

The ROM 70 is a read-only memory that stores various types of program data and parameters with which the CPU 68 performs various types of calculations and controls. Although the CPU 68 can read programs, data, and parameters from the ROM 70, the CPU 68 cannot rewrite and erase them.

The RAM 72 is used as a working memory of the CPU 68. The CPU 68 can write and erase programs and data to and from the RAM 72.

According to the present embodiment, the RAM 72 has areas for which the CPU 68 performs the sales estimation process, the allocation limit management

process, the use-up process, and various information processes. The RAM 72 composes allocation limit information storing means in which an allocation limit structure is extended.

The input device 74 is composed of for example a keyboard and a mouse.

The operator can correct an estimated sales quantity, an allocated quantity, and so forth with the input device 74.

The keyboard is a device that inputs information such as characters and numeric letters to the management center 5.

The keyboard is composed of alphanumeric keys, Kana keys, ten keys, various functional keys, cursor keys, and other keys.

The mouse is a pointing device. When the operator operates software with a graphical user interface (GUI) or the like, he or she can input desired information by clicking mouse buttons at button images and icons displayed on a display device.

The output device 78 is composed of for example a display device and a printing device.

The display device is a device such as a cathode ray tube (CRT) display, a liquid crystal display, or a plasma display that displays information on a screen.

The display device can display a sales

estimation screen, an allocation limit structure, and so forth.

The display device composes presenting means that presents an allocation limit structure.

An allocation limit structure can be presented in the management center 5 and the manufacturer's system 12.

However, an allocation limit structure presented in the manufacturer's system 12 has a range limited by the higher search prohibition region 32.

The printing device is a device that prints output information such as an estimated sales quantity on a printing medium such as paper. The printing device is one of various types of printers such as an ink jet printer, a laser printer, a thermal transfer printer, and a dot printer.

The communication controlling device 82 is a device that is connected to a network for example the Internet or a local area network (LAN) and that is connected to server devices and terminal devices disposed in the manufacturer's system 12, the transporter's system 13, and the dealer's system 14 through a communication line.

The communication controlling device 82 is controlled by the CPU 68. The communication controlling device 82 transmits and receives signals and data in accordance with a predetermined protocol.

The storing medium driving device 76 is a driving device that drives a detachable storing medium and reads and writes data therefrom and thereto. Examples of detachable recording mediums are a magneto optical disc, a magnetic disc, a magnetic tape, a semiconductor memory, a data punched paper tape, and a CD-ROM. A CD-ROM and a paper tape are read-only mediums.

The storing device 88 is composed of a readable and writable storing medium and a driving device that reads and writes programs and data therefrom and thereto. The recording medium is mainly a hard disk. Alternatively, the storing device 88 may be composed of another readable and writable storing medium such as a magneto optical disc, a magnetic disc, or a semiconductor memory.

The storing device 88 stores various types of programs such as a sales estimation program 50, an allocation limit management and use-up program 52, an order receiving program 54, and other programs 56 and a database 58 that stores various types of data such as allocation limit structure data for each commodity type, and use-up data using shipment deadlines. The database 58 stores an allocation limit structure that is extended to the RAM 72. The database 58 also composes allocation limit information storing means.

The CPU 68 drives the driving device of the

storing device 88 so as to read and write programs and data from and to the storing device 88.

The sales estimation program 50 is a program that causes the CPU 68 to perform a sales estimation function. When the CPU 68 executes the sales estimation program 50, the sales estimating system 7 (see Fig. 3) is accomplished.

When the CPU 68 executes the allocation limit management and use-up program 52 and the order receiving program 54, the allocation limit management and use-up system 8 and the order receiving system 9 are accomplished.

The other programs 56 are composed of various types of programs for example a communication program that communicates with for example the manufacturer's system 12, the transporter's system 13, and the dealer's system 14 and an operating system (OS) that is a fundamental program that manages a memory and manages inputs and outputs.

In addition, the other programs 56 contain a program that causes the dealer's system 14 to generate data that designates an allocation limit structure and transmit the data to the dealer's system 14 (presenting means).

The input/output interface 84 is composed of for example a serial interface and other interfaces in accordance with other standards. When an external

device that corresponds to one of such interfaces is connected to the input/output interface 84, the function of the external device can be expendably used.

According to the present embodiment, while allocated quantities are managed using a hierarchical allocation limit structure, a deadline management is performed with shipment deadlines. However, those methods are independent technologies. Thus, a distribution system using any one of these methods can be accomplished.

In other words, while commodities are allocated in accordance with a conventional method, a deadline management may be performed with shipment deadlines. Alternatively, while allocated quantities are managed with a hierarchical allocation limit structure, a deadline management may be performed on daily basis as conventional manner.

In the foregoing example, commodities are allocated using an allocation limit structure, whereas a deadline management is performed with shipment deadlines. These operations are independently performed. However, they can be organically combined.

In other words, shipment deadline information may be contained in allocated quantities of allocation limits. As a result, an allocated quantity is used up in accordance with a customer's requested deadline.

Even if an allocated quantity is used up with

an allocation limit in a lower hierarchical level, when the allocated quantity does not satisfy a requested deadline, the allocation limit management and use-up system 8 searches allocation limits that satisfy the quantity and requested deadline in higher hierarchical levels. When there is an allocation limit that satisfies the requested deadline in a higher hierarchical level, the allocation limit management and use-up system 8 uses up the allocated quantity.

The commodity distributing system 1 can be more effectively applied to commodities whose demand exceeds the supply. In this case, the commodity distributing system 1 can control orders in accordance with customer segments.

Using shipment deadlines, the following structures can be obtained.

A commodity allocating system comprises shipment schedule information obtaining means for obtaining shipment schedule information composed of possible shipment time for a predetermined commodity type, a possible shipment quantity, and a shipment deadline for an order of commodities; order information obtaining means for obtaining an ordered quantity from an ordering customer and storing the ordered quantity; shipment deadline selecting means for selecting a predetermined cargo pickup time with the obtained shipment schedule information; searching means for

searching commodities that have not been allocated to a customer in the shipment schedule information in the direction of which time is traced back with a reference point of the selected shipment deadline; allocating means for allocating the searched commodities to the ordering customer when the searched quantity satisfies the stored ordered quantity; and allocation information storing means for updating allocation information that correlates the ordering customer and the commodities with an allocated result of the allocating means (first structure using shipment deadlines).

In the first structure, the order information obtaining means further comprises required time period calculating means for obtaining a requested deadline and a recipient, designating a transportation route to the obtained recipient, and calculating a time period necessary for transporting the commodity to the recipient through the designated transportation route, wherein the shipment deadline selecting means is configured to select the latest shipment deadline that is earlier than the obtained requested deadline with the calculated time period (second structure using shipment deadlines).

In the second structure, when the quantity of commodities searched by the searching means with the shipment deadline selected by the shipment deadline selecting means does not satisfy the stored ordered

quantity, the shipment deadline selecting means is configured to select a shipment deadline that is later than the selected shipment deadline, that is closest to the present time, and that allows the quantity of commodities searched by the searching means to satisfy the ordered quantity (third structure using shipment deadlines).

In the first structure, the commodity allocating system further comprises shipment schedule information designating means for correlating commodities and customers for each of a plurality of types of commodities and designating shipment schedule information containing information that is changed; shipment schedule information updating means for updating the designated shipment schedule information with the changed information, not the other shipment schedule information; and re-allocating means for re-allocating the commodities to the ordering customer with the updated shipment schedule information (fourth structure using shipment deadlines).

In the fourth structure, the commodity allocating system further comprises deadline replying means for replying deadlines for commodities that have not been allocated by the re-allocating means (fifth structure using shipment deadlines).

In the first structure, the commodity allocating system further comprises sales quantity

estimating means for estimating a sales quantity of commodities in each of predetermined time periods; and shifting means for shifting possible shipment time for at least part of scheduled commodities in the shipment schedule information to a future direction so that the possible shipment quantity satisfies the estimated sales quantity (sixth structure using shipment deadlines).

In the first structure, the commodity allocating system further comprises possible quantity designating means for designating possible order quantity information that represents a quantity of commodities of which a customer can order to allocation limit information designated to the customer; allocation limit information storing means for storing the allocation limit information to which the possible order quantity information has been designated; and updating means, wherein the allocating means is configured to allocate the ordered quantity to the customer so that the ordered quantity does not exceed a possible order quantity designated with the possible order quantity information of the allocation limit information designated to the ordering customer, and wherein the updating means is configured to update the possible order quantity information of the allocation limit information to information that designates a possible order quantity that has been allocated with

the allocated quantity (seventh structure using shipment deadlines).

Although the present invention has been shown and described with respect to a best mode embodiment thereof, it should be understood by those skilled in the art that the foregoing and various other changes, omissions, and additions in the form and detail thereof may be made therein without departing from the spirit and scope of the present invention.

1. A commodity allocating program that causes a computer to accomplish the functions of:

pre-allocating commodities to a customer with a shipment schedule of a predetermined commodity type in a predetermined future period;

designating possible order quantity information that represents a quantity of the commodities that the customer can order to allocation limit information designated to the customer;

storing allocation limit information to which the possible order quantity information has been designated;

obtaining an ordered quantity from an ordering customer that order the commodities;

allocating the obtained ordered quantity of the permissible order quantity to the ordering customer with the possible order quantity information of allocation limit information designated to the ordering customer;

updating possible order quantity information of the allocation limit information with the allocated quantity;

presenting possible order quantity information designated to the allocation limit information,

wherein a range of allocation limit information for possible order quantity information is designated for each presentee presented by the presenting function;

wherein the presentee is designated to allocation limit information in the lowest hierarchical level, and

wherein the range of the presentable allocation limit information is allocation limit information having a hierarchical relation with the allocation limit information in the lowest hierarchical level designated to the presentee.

2. The commodity allocating program as set forth in claim 1,

wherein the hierarchical relation has a higher, lever presentation prohibition region, and

wherein the presentable allocation limit information is restricted at the higher layer presentation prohibition region.

3. The commodity allocating program as set forth in claim 1 or 2,

wherein the hierarchical structure of the allocation limit information is designated for each commodity type.