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(54) Benævnelse: **Fremgangsmåde til styring hhv. håndtering af en materialestrøm i en trykkemaskine**

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DESCRIPTION

A method for controlling a material flow in a multi-level system comprising a printing press and a system for controlling the material flow in a system comprising a printing press

The invention relates to a method for controlling a material flow in a multi-level system comprising a printing press and a system for controlling the material flow in a system comprising a printing press according to claims 1 or 15.

A book manufacturing system with several production machines, such as e.g. a gathering machine, adhesive binder and three-sided cutting machine is known from DE 197 40 974 A1, wherein by means of computers order data are processed, setup measures are carried out and machine processes are monitored program controlled. The computers comprise a master computer, which is connected via a data bus system to SPSes and work stations. Stored in memories that are connected to the master computer by means of electrical signals are databases among others with product data, order data, client data and material master data as well as programs among others for system configuration, process configuration and order monitoring. The program module “Planning and Control” comprises means for resource planning and planning the machine utilization. In a module for “process planning” among other things product structuring, modeling of process steps and the definition of variables such as paper type, format, binding, glue type and other variables take place.

EP 0 654 721 B1 relates to an automatic fabrication system, wherein by means of a system for the information flow between the system units and the workpieces or tools a flexible, in particular job-related production with many different workpieces in small batch sizes should be made possible. The workpieces to be processed are in each case mounted on pallets, which are clampable in the correct position on the machining and measurement points and comprise a data memory on which information that is readable can be read at the stations about the specific processing program. Data relevant to further machining can also be stored on the data memory of the pallet.

From DE 43 29 886 A1 a sequence controller for printing plants with data input and data output units connected via a network is known, wherein machine-specific data about the data input units can be manipulated in a memory unit, and the manipulated data can be retrieved at all data output units.

From a brochure relating to the "RAPIDA 106" of the company Koenig & Bauer AG for example on pages 28 and 29 a printing chamber with several printing presses and a logistics system is known, wherein in one design the feeders are equipped with means for an interruption-free material feed. In the logistics system a stack turner for exchanging a single use for a non-stop logistics pallet and a pallet inverter for turning and a pallet dispenser for receiving empty non-stop pallets are provided. By means of a remote controlled transport carriage a stack can be removed from a roller conveyor and moved to a predetermined destination, wherein a destination determination can occur by means of EAN coding.

DE 201 22 255 U1 relates to an alignment station in a logistics department for printing plants and discloses an arrangement for logistics on sheet processing printing presses with a delivery service, with a high rise storage, with conveyor lines to the machines designed as roller conveyors, with parking areas for sheet stacks to be provided and with a restacking position, at which the stack can be relocated on system pallets for the non-stop stack changing of pallets. At the output side the stack can be forwarded again on a conveyor system or fed for further processing via further conveying means.

In DE 10 2012 215 369 A1 a method and a device for handling printing material drums in a printing material supply system of a printing plant comprising a printing press is disclosed, wherein an automated further moving of a drum moving into a checkpoint can take place only after confirmation.

DE 201 22 255 U1 discloses a printing plant with several parallel printing presses and stacking logistics and is geared toward a stacking control system. The plant comprises among other things a warehouse and a station for repalletizing the stack on system pallets, in order to make possible an interruption-free feed and delivery downstream. System pallets can be conveyed by a forklift or a conveyor system from feeder to delivery. For the case of further processing downstream a circuit can be required for the system pallets. In conjunction with the logistics, a data system is advantageous for easier setup of the machines, for tracking the sheets and for inventory control of the raw material. The respective stack can be provided with a coding during repalletizing or already at delivery, which contains its properties and its processing information in its origin. This coding of the stack or of the

pallets bearing the stack make it possible to control and know down to the last detail at all times the inventory and the circulation of these wares. The feed to the printing press and the further transport of a stack could be improved by such coding, for example bar coding or magnetic coding and the control of the stack can be adapted to the controller of the printing press or of the entire logistics system can be influenced.

DE 199 26 822 A1 discloses a design for a pallet exchange device with support rods arranged in rake-like manner for temporary catch of the stack to be relocated.

DE 39 14 238 A1 relates to a method and an arrangement for controlling printing presses with a personal computer, which is connected to a driverless transport system via a data line, said transport system automatically feeding the printing material printed material to the printing presses.

An article relating to Drupa by Frank Lohmann on the Internet about "Fahrerloses Transportsystem für Papierstapelwechsel an Druckmaschinen" [Driverless transport system for paper stack changing on printing presses] of Fa. Asti discloses a driverless transport vehicle for stack changing at the feeder and delivery of a printing press. Such a transport vehicle should also be used with other production machines, such as punch presses and folding machines.

DE 20 2008 008 081 U1 discloses a printing plant with several parallel printing presses and stacking logistics and is directed at a transport system for transporting empty pallets from feeder to delivery of the printing press.

DE 101 22 430 A1 discloses a printing plant with several parallel print machines and stacking logistics and is directed at a return transport of a e.g. defective stack away from the sheet feeders of the printing press.

DE 37 39 659 C1 relates to an apparatus for feeding a stack of cardboard blanks to a magazine of a cardboard packaging machine, wherein a pallet loaded with blanks is brought to the magazine by a driverless transport system. To avoid finishing, the pallet is already loaded with the blanks at the manufacturers.

US 3 180 638 A discloses an apparatus for a nonstop sheet supply/feed.

DE 11 2005 002 817 T5 discloses an automated material handling system for an automated production environment by means of a system for the production of semi-conductor components. In so doing, a “dispensing means” maintains a calendar, in which processing jobs and transport jobs are stored. The dispensing of the transports and processing jobs occurs then e.g. using a contract negotiations protocol, for example from the perspective of meeting deadlines, an effective utilization of machines or others. According to a contribution published in Wikipedia on 31/12/2013 the JDF format is characterized as an open file format which is supposed to become popular/gain acceptance for the graphics field as an industry standard. It is based on XML and is supposed to make direct data exchange possible between the EDP systems and the different system components.

DE 102 45 658 A1 relates to a method and an apparatus for automatic material supply of a processing machine, in particular for automatic web supply of a web-fed press, with a material flow system. A planning level of the material flow system is responsible for consumption calculation relating to the pending productions, a storage - and a supply strategy as well as for warehouse and inventory management. A coordination level receives information from the planning level about where, when and which roller is required. The coordination level causes and coordinates the storage and transport operations necessary for this. The concrete execution of the transport jobs received from the coordination level, i.e. the movement control of the transport means to be addressed, takes place in an execution level.

DE 10 2010 041 837 A1 discloses a method and an apparatus for controlling transport means in a material transport system of a web-fed press, wherein at one or more checkpoints of the transport path read devices read information from an information carrier arranged on the transport means. An exact position of the transport means is discernible thereby and if necessary to this end in addition information individualizing the transport means can also be read.

DE 10 2005 054 496 B3 relates to a method for creating an electronic data record, wherein the data record is stored at the printing material unit and is updated with respect to data relating to the printing material.

DE 10 2006 061 119 A1 discloses a production flow controller for a printing plant, wherein by means of a cross-process transport of data bound to printing materials and printed products a printing material transport to transport pallets is

supposed to be improved in a printing plant processing sheets. To this end permanent or erasable data memories are provided in which logistics data and processing data can be stored, updated and read. As a result errors can be efficiently prevented, which for example could otherwise arise due to the fact that slips of paper are lost from the stack during unpacking. For example, stacks of printing materials that are not part of the order currently to be processed can also be extracted from the path to the printing press.

Also in DE 10 2006 033 365 A1 is it possible to use processing parameters about the printing material stack supplied with the stacks containing barcodes or data carriers can be checked to determine whether the printing material matches the provided order. The supplied processing parameters can also comprise order data, e.g. in the order data mentioned in the JDF specification.

According to a contribution published in Wikipedia on 31/12/2013, the JDF format is characterized as an open file format which is supposed to become popular as an industry standard for the graphics field. It is based on XML and is supposed to make direct data exchange possible between the EDP systems and the different system components.

DE 20 2007 012 351 U1 relates to a production system for manufacturing printed products and is meant to counter the disadvantages that arise in multi-level production with printing and punch presses without a direct material flow chain. The latter is disadvantageous with respect to occurring printer’s waste, required warehouse space and requires a complicated removal from the warehouse after printing. DE 20 2007 012 351 U1 proposes controlling transports between

printing presses and punch presses on corresponding transport paths by means of a common controller. Using order data and the current capacity, the controller calculates the medium-term capacity of the printing presses and punch presses and the transport paths by means of optimization algorithms for the products of in each case a printing press to a respective punch press. The points of the transport system are switched corresponding to the transport paths found in this way.

EP 2 481 566 A1 discloses a method and a system for processing orders for manufacturing sacks, wherein production data of two machines are transferred to a controller and wherein the controller determines control commands for the production sequence from the data in the at least two machines connected to the controller. In so doing the controller can execute calculations about the most favorable sequence of orders and use them as a basis for controlling the machines. To track boundaries between subsets of sacks or semi-finished sack products during operation on the way through the system, the subsets processed by the system by a control device can be assigned the data characterizing the subset. Changes in the processing status of the relevant subset can also be added by the system.

The invention addresses the problem of creating a method for controlling a material flow in a multi-level system comprising a printing press and a system for controlling the material flow in a system comprising a printing press.

The problem is solved in accordance with the invention by the features of claim 1 or 15.

The advantages that can be achieved with the invention consist in particular of the fact that an effective and/or secure supply of a production plant with several processing steps, in particular levels is created while minimizing the space and/or resource requirements necessary for this is created. This is advantageous, in particular production plants designed for multiple and multiple-level production with a decoupled material throughput having at least two succeeding processing steps or levels, in which a plurality of material units on the output side of a processing level are first combined into a drum before they are fed as a drum of a further processing or an intermediate storage.

In the case of several processing levels the incorporation of the transports at least between two processing levels or aggregates is advantageous, for example including an intermediate or buffer storage, advantageously including also at least the last transport section in the delivery of the first processing step to be performed. Particularly great advantages arise for systems with at least three processing steps or levels, e.g. at least one printing, one punching and at least one further processing, wherein in the material flow controller at least the last transport section for the first processing step and also the transport paths between the first and second, as well as the second and third processing step are controlled by the material flow controller, wherein in between also paths to and from one or more buffer storages n can be included. In such complex processes the material flow controller can likewise ensure effective sequences.

For example, preferred existing buffer storage is also managed by the system for material flow control.

In an especially advantageous partial aspect for the design of a plant or a system a control of the material flow is provided via a material flow controller which has access to the data of pending orders, access to data from production planning and access to the processing status of data representing drums to be handled as well as an implemented logic, by means of which while using such data - independently or in response to impetus - generates transport orders and transfers to control means, in particular a vehicle controller, from driverless transport means provided for transport. This applies at least for the part of the plant integrated in the material flow controller, for example at least one or more printing presses and at least one or more of a further type of processing aggregate, e.g. one or more punching devices, and part of the transport means, e.g. to at least the transport paths arranged directly upstream on the input side and arranged directly downstream on the output side to a further aggregate downstream and/or to a buffer storage.

A design of the plant and/or system for controlling the material flow is particularly advantageous, wherein the transport of the drum, in particular of the drum configured as stacks of sheets, occurs from a receiving warehouse to a processing aggregate and/or between a processing aggregate and a subsequent processing aggregate automated using driverless transport means, to which corresponding transport orders are transferred from a higher level material flow controller of a plurality of transport means of the same or a different type. In one particularly advantageous improvement, along with the material flow controller, the system comprises a warehouse management system connected to or integrated in said material flow controller, wherein removal instructions or corresponding

transport orders are generated at transport means of the warehouse e.g. also by the material flow controller.

Preferably both a transport on at least a last portion of the transport route to a processing aggregate and a transport on at least a first portion of the transport route away from the processing aggregate occurs by driverless transport means, whose control means receive the corresponding transport order between a pick-up position and a delivery position from the higher level material flow controller. The transport means preferably configured as driverless transport vehicles can in this connection be designed as transport vehicles conducted mechanically on a transport route, in particular rail-bound transport vehicles of a transport system based on mechanical guidance or as a contactless, i.e. without mechanical guidance, transport vehicle guided along a transport route of a correspondingly set-up system (FTS). At least between the output of the first processing level acting on the material units and an input for the second processing level acting on the material units and a storage if necessary provided in between in the process and/or for the return transport of empty system transport means the driverless transport vehicles are configured preferably contactless. For the transport from the warehouse to the first processing level or an upstream conditioning, a mechanically guided driverless transport vehicle can be provided at least on a section.

Particularly advantageously, the material flow controller is configured to receive data about pending orders and data of a production plan from a planning and/or control system of the production plant via at least one correspondingly set up interface.

Preferably the plant or the system for controlling the material flow is configured with signal connections between the material flow controller and the processing aggregates integrated in the material flow system and with a correspondingly installed interface in order to receive information about the status of the drum and/or information about a jam of the processing aggregate from the processing aggregates integrated in the material flow system or controllers and/or signal transmitters assigned there. Preferably the material flow system is configured to receive the data on the current status of drums in a set of corresponding specifications in the form of a file. Particularly advantageous is a design in which between the material flow controller and the aggregates integrated in the material logistics system - e.g. at least a printing press and a further, preferably mechanical processing level - an exchange or a transfer of a file containing the information about the status of the - in particular at the output of the relevant processing level - stack occurs or can occur in the manner of an electronic drum card. As an alternative, an aforementioned transfer of drum-specific data to the material flow controller can take place, but the data to be updated itself - e.g. on a read-write memory (for example a transponder) can be carried along by the drum or by the respective current transport means.

In particular a solution in accordance with the invention provides a method for controlling a material flow in a multi-level system (01) comprising a printing press and at least one further processing aggregate processing sheet-shaped material sections (02.j), wherein a plurality of material sections to be processed are transported in a drum by at least a first transport means to a processing aggregate configured as a

printing press, the material sections run through the printing press at least once and in the process are printed at least once and the at least once printed material sections have run through the printing press at least once are transported in at least one drum by the at least first transport means or a second different transport means for further processing away from the printing press to a further processing aggregate differing from the printing press or as an alternative are transported for intermediate storage to a storage position of a warehouse before at least for transports away from the printing press to the further processing aggregate or to the storage position transport orders are generated by data processing means of a material flow controller, and the relevant transports occur on the basis of these transport orders generated by the material flow controller.

One solution in accordance with the invention for handling stacks of material sections in a system for producing products from originally sheet-shaped or plate-shaped material sections in several processing steps, wherein at least one handling aggregate brings a stack with material sections to be processed to a system transport means, the stack is transported downstream of the handling aggregate by a first transport means to a processing aggregate designed as a printing press, in which the material sections are printed one or multiple times, and on the output side of the printing press the printed material units are combined into at least one stack on a further transport means, provides that the stack combined on the further transport means with the material sections printed at least once downstream of the printing press is fed by a first or a second transport means optionally along a transport path from the printing press for further processing to a further processing aggregate or along

a deviating transport path for an intermediate storage arranged upstream of the further processing in the process sequence to a storage position of a warehouse lying outside of the initially mentioned transport path, and by means the at least first, second or third transport means an empty system transport means is returned individually or in groups along a transport path from a removal position to be assigned to the input region of the printing press to an advanced position of the handling aggregate provided for the relocation.

A system in accordance with the invention for controlling the material flow in a plant comprising a printing press and one or more further sheet processing processing aggregates provides a material flow controller comprising a data processing means, which material flow controller is from a programming point of view is equipped to generate, from data present in electronic form about an order description and a sequence and resource planning, a transport order for the transport of a stack from material sections to be processed from a defined start position to a defined destination position and feed to a transport means controller assigned to one or more transport means and/or is equipped to do so.

A device in accordance with the invention for handling stacks of material sections in a plant for producing packaging and/or printed products in several processing steps, comprising at least a first processing aggregate configured as a printing press, by means of which the material sections can be printed once or multiple times, at least one handling aggregate arranged upstream of the printing press in the transport path, by means of which a stack with the material units to be processed can be brought to a system transport means differing from the previous transport means, on the output side of the

printing press a stacker, which is configured for accommodating a further transport means and by means of which material units printed in the printing press are to be combined in at least one new stack, a transport path, via which the new stack with the printed material units can be conducted by at least one transport means along a transport path from the printing press for further processing to a further processing aggregate, provides that a further transport path is provided, via which the new stack, instead of being brought directly to the further processing aggregate, can be conducted by the at least one or a further transport means for intermediate storage of a storage position of a warehouse, and that a transport path is provided upon which by means of the at least one or by means of a further transport means an empty system transport means can be returned from a removal position to be assigned to the input region of the printing press individually or in groups to an advanced position of the handling aggregate provided for the relocation.

The mentioned designs in accordance with the invention and the especially advantageous designs can be improved by the description and/or the claims individually or in combination with features to be inferred.

Exemplary embodiments of the invention are presented in the drawings and will be described in greater detail in the following.

The figures show the following:

Fig. 1 shows a schematic representation of an example of a production plant configured for multiple, in particular multiple-level production;

Fig. 2 shows an example of a product to be produced with a production plant a) as an intermediate product or as a semi-finished product and b) as a finished product;

Fig. 3 shows an example of the material side and control engineering connection of a processing aggregate;

Fig. 4 shows a schematic representation of phases of an interruption-free material feed;

Fig. 5 shows a schematic representation of phases of an interruption-free material removal;

Fig. 6 shows a perspective representation of an example of the design of a system transport means circulating in the system;

Fig. 7 shows a perspective representation of an example of the design of a standardized transport means;

Fig. 8 shows a perspective representation of an example of the design of a handling aggregate configured as a turning and/or conditioning device;

Fig. 9 shows a perspective representation of an example of the design of a handling aggregate configured as a turning aggregate for transport means with a stack of turned transport means;

Fig. 10 shows representations for the design of transport means configured as forklift trucks;

Fig. 11 shows a process chain representation of processing and handling processes in the manufacturing of a product;

Fig. 12 shows a representation of information flows in a plant configured for multiple and/or multiple-level production of products;

Fig. 13 shows a schematic representation for an example of a system architecture for material flow control in a

production plant configured for multiple and/or multiple-level production;

Fig. 14 shows a schematic representation of a file-based information transfer using the example of order-relevant data;

Fig. 15 shows a schematic representation of an access-based information transfer using the example of order plan relevant data;

Fig. 16 shows a schematic representation of a material management system and the interaction with acquisition means;

Fig. 17 shows a schematic representation for the operation of revising or recreating a record of drum data;

Fig. 18 shows a schematic representation for providing a record of drum data from the material management system;

Fig. 19 shows a simplified block diagram with a representation of communication paths and interactions;

Fig. 20 shows a schematic representation for the interaction of the subsystems interacting for the control of the material flow.

A material processing plant 01, in particular a production plant 01, is configured to manufacture a product 03 from raw material in a preferably multiple, in particular multiple-level and/or discontinuous process P, e.g. production process P. A process P with at least one processing step P.x is to be understood as a discontinuous process, in which a plurality of material units processed sequentially in this process step P.x on the output side of the process step P.x - in contrast for example to a continuous further flow - are first combined into a drum, before then being fed to a next processing or storage as a drum. For example, this can be printing or some other

type of processing of material in pieces. By multiple processing procedure, a process is understood by means of which in which raw material, for example material units 02.0 to be processed, in one or in several drums 04.0 related to the same production order A, order A for short, are or can be processed sequentially in at least two process steps P.x, repeating or differing in the manner of processing, e.g. of a processing level S.q, process steps P.x, (P.x with x =- ϵ IN, x ≥ 2). For example, this can be a multiple printing or some other type of processing in the same processing level S.q with the same or a different resource.

As multiple-level and discontinuous production process P a process P is to be understood in which raw material, for example material units 02.0 to be processed, in one or more drums 04.0 related to the same production order A, order A for short, are processed or can be processed in sequence by at least two, in particular processing levels S.q differing in the type of processing (with q = 1, 2, 3, … s; s ϵ IN, S ≥ 2, where s should designate the number of possible processing levels S.q). The processing levels S.q are or can be operated with material throughput decoupled from one another. The material units 02.0 to be processed can preferably be workpieces 02.0 present individually in the drum 04.0, e.g. a material stack 04.0 or if necessary also as drum sections 02.0 not yet cut, e.g. material sections 02.0, of a contiguous drum 04.0 if necessary to be broken up process downward, e.g. a material roll 04.0.

In such a production process P, preferably multiple, in particular multiple-level, and/or discontinuous production process P in an i-th processing level S.i (q = i, i ϵ IN, i ≤ s) a drum 04.j (j ϵ IN_0, j ≤ s, in particular j = i-1) with a

plurality of e.g. previously j-times processed material units 02.j, e.g. workpieces 02.j of the same type and of the same processing status or e.g. the drum sections 02.j of a contiguous drum 04.j, of its i-th processing level S.i and after its processing the drum 04.j+1 with the now (j+1)-times processed material units 02.j+1, e.g. workpieces 02.j+1 or drum sections 02.j+1, until if necessary removed scrap, preferably as a whole or if necessary in several batches from there directly or after an intermediate storage of a subsequent processing level S.i+1 in the process P are fed. For example, a drum 04.0 (j=0) to be processed in a first processing level S.1 (q=1) with a plurality of material units 02.0 not yet processed, e.g. workpieces 02.0 of the same type or drum sections 02.0, of this first processing level S.1 and after its processing the drum 0.41 is fed with the material units 02.1 now processed once, e.g. workpieces 02.1 or processed drum sections 02.1, until if necessary removed scrap, as a whole or if necessary in several batches from there directly or after an intermediate storage of the subsequent processing level S.2 (x = i+1 = 2) in the process P. A drum 04.s exiting the last processing level S.s (x = s) provided for production finally comprises the or a part of the products 03 which have been or are manufactured by the production process P from the multiple, in particular multi-level processing of the material units 02.0, e.g. workpieces 02.0, originally fed to the process chain. For the variant with the feed of uncut drum sections 02.0 this drum 04.0 can be cut into individual material sections 02.j in the course of the process P in a first processing level S.1 in front of the processing levels S.q, if necessary in one of the other processing levels S.x. As an alternative, the products 03 can be present at the process end as material sections of an unbroken drum.

In contrast to continuous multiple, in particular multiple-level processes, e.g. along an assembly line or another continuous conveyor system, the material flow through the independent processing levels S.q and their operation, e.g. within those restrictions separate from each other and decoupled, is constituted by a corresponding management in the provision of the material units 02.j or drums 04.j to be processed on a template of the relevant processing level S.i and by the respective removal of the material units 02.j+1 e.g. present as intermediate products and products 03 or their drums 04.j; 08 from a delivery of the current processing level S.i.

Although the subsequent explanations to a great extent relate to the example of the preferred design with material units 02.0 to be processed present as individual workpieces 02.0, they are to be generalized - wherever appropriate and possible and also not expressly excluded - to the processing of material units 02.0 of both design variants, thus also - at least as far as the processing in the first processing levels S.1 is concerned - the processing of material sections 02.0 of contiguous drums 04.0. For generalization purposes in the following the phrase “material section” or “material unit” will be used in place of “workpiece” and e.g. the more general term “drum” will be used in place of “stack”. For a transfer to the second mentioned variant in the following e.g. the phrase “material section” or “drum section” will be used in place of the term “workpiece” and e.g. the expression “material roll” will be used in place of the term “stack”.

In a variant of the embodiment not shown the material units 02.0 to be processed as workpieces 02.0 of an identical

development to products 03 of a drum 04.0 can be provided by a processing level arranged upstream (corresponds in the systematics of the figures e.g. to a processing level "5.0") in the process control of the first processing level S.1 shown, e.g. by a guillotine trimming by means of a corresponding cutting device, from large format raw material drums, e.g. from larger material plates or sheets or from raw material to be unwound from raw material rolls, and combined into the drums 04.0 to be processed of a specified number of workpieces 02.0 of the same development. Preferably however, the workpieces 02.0 of the same development or the drums 04.0 comprising these - as presented below by way of example for a design of the production plant 01 preferred here - are fed in the region of a delivery 06, e.g. a incoming goods 06, to the production plant 01. The product 08 manufactured by the production plant 01 through several processing levels S.q and if necessary combined in packaging and palletizing into new, order-related/specific drums 03, e.g. product drums, - as a finished product or as a semi-finished product to be completed by the client or by an end client, e.g. as blanks, - for example after a packaging exits the production plant 01 at a product or outgoing goods output 07.

Although the following representation of the especially advantageous solutions or parts of the solution occurs using the example of the especially preferred design as a multiple, in particular multiple-level production plant 01 processing packaging resins and/or printing material and/or producing packaging and/or printed products 03, the teaching is not supposed to be restricted to only this type of plant, but rather can also be applied and transferred to other multiple, in particular multiple-level manufacturing and/or production plants 01 with e.g. processing levels S.q that can be operated

independently from one another. In such a manufacturing and/or production plant 01 with at least two processing levels S.q e.g. a plurality, in particular a plurality of material units 02.0 with an identical quality (material, processing state) is or can be fed as a drum 04.0 of a first of the at least two processing levels S.1, at the output of this processing level S.i a drum 04.1 is formed or can be formed with a plurality, in particular a plurality of processed material units 02.0, this drum 04.0 with processed material units 02.1 subsequent to the finishing of the drum 04.1 is or can be fed/supplied optionally directly or after an intermediate storage P.15; P.20 at a later time and/or using at least one conveying means that can be operated autonomously from the operation of the two processing levels S.i; S.i+1 of the second of the at least two processing levels S.i+1, e.g. a mechanical processing, S.2; S.3. The same applies in a preferred improvement between the second and a further processing level S.i+2. In one improvement the plant 01 can be configured such that subsequent to the finishing of the drum 04.1 after the first of the mentioned processing levels S.i this drum 04.1 can optionally be conveyed instead to the second - directly or via an intermediate storage P.15, P.20 - to a further processing level S.i+2.

The production plant 01 configured for multiple in the above sense discontinuous processing, in particular multiple-level and discontinuous processing, is preferably configured as a production plant 01 by means of which packaging resins and/or printing materials, in particular material units 02.0 or workpieces 02.0 are or can be processed to printed products 03 configured as packaging resin and/or printed products 03, e.g. as products 03 configured as packaging and/or printing products 03. In the process the term of packaging and/or

printed products 03 or packaging and/or printing products 03 should include both end products, for example folded and/or glued packaging containers, such as e.g. open or sealable boxes, cartons or trays, as well as semi-finished products to be delivered to clients, for example packaging blanks comprising punched and e.g. grooves facilitating the folding along the fold lines and/or already broken away packaging blanks, e.g. such as already punched out and if necessary pre-creased and already broken away folded sheets, e.g. as so-called blanks, for folding boxes, cartons or trays to be finished by the client or end client by folding and if necessary insertion and/or bonding. Such finished and semi-finished products should be included in the term of packaging products. Also individual (packaging) material units 02.j or material units present as material sections on a roll, for example such as film, cardboard packages or corrugated cardboard, can be included by this term.

In the advantageous design presented here the plant 01 is designed as a production plant 01, which as one of the processing levels S.1, S.1' comprises a single or multiple material application S.1, S.1', e.g. in the form of a single or multiple printing S1.1 and/or coating S1.1' (e.g. a painting and/or a lamination and/or a film lamination and/or a embossed film printing and/or a blind embossing and/or a cold foil finishing and/or a lamination and/or a surface application of glue). To this end the production plant 01 comprises at least one aggregate 1 configured as a printing press 11, e.g. processing aggregate 11, and/or at least on aggregate 12, e.g. processing aggregate 12 for coating and or print finishing. In the preferred design the aggregate 11; 12 is a sheet processing aggregate 11; 12, wherein along with processing sheets in the above narrow sense in the further

sense the processing of sheet-like and plate-like material units 02.j can also be included.

As an alternative to coating S.1' the processing levels S.1' for the material application S.1' can be configured as a lamination S.1' in the production of multiple layer products 03, e.g. such as corrugated cardboard sheets, or products 03 to be formed from this.

In addition, the production plant 01 comprises at least one further, processing level S.2 (S.2' etc.) acting mechanically on the material units 02.j, e.g. workpieces 02.j, or drums 04.j; S.3; S.5. To this end the production plant 01 comprises at least one aggregate 13; 14, 18 differing in the manner of processing from the initially mentioned processing aggregates 11; 12, e.g. processing aggregate 13; 14, 18 for mechanical processing S.2 (S.2' etc.; S.3', S.5 and if necessary one or more aggregates 16; 17, e.g. processing aggregates 16; 17 for a bonding gluing/adhesion S.4; S.4', e.g. a bonding S.4 of tabs and/or a bonding S.4' of windows.

This at least one further mechanical processing level S.2 (S.2'; S.2''; S.2''') can be constituted by a single or multiple cutting or slitting S.2 (S.2'), e.g. preferably a punching S.2 and/or if necessary a cross-cutting (S.2') of material sections 0.2j not shown in the figures from a web-shaped drum 04.j. In this connection the production plant 01 as a processing aggregate 13 can comprise at least a punching device punch press 13, e.g. a so-called automatic punching machine 13, and/or at least one cross-cutter device not shown in the figures, e.g. in the manner of a sheeter. With a punching S.2 or a punching device punch press 13 the production plant 01 is configured for example for

manufacturing printed and/or coated packaging products 03. i.e. printed and/or coated packages or packaging semi-products. In addition or instead of this, a single or multiple-level or multiple reforming (S.2''; S.2'''), e.g. an embossing (S.2'') of the workpiece surface with an embossing tool or a corrugation of the workpieces 0.2; not yet processed or already processed once or multiple times by a grooved roller can be provided as at least one further mechanical processing level. In this connection the production plant 01 can comprise as a processing aggregate at least one embossing device not shown in the figures and/or at least one corrugating unit not shown in the figures, e.g. with a grooved roller.

In the preferred design the mechanical processing aggregate 13 is also a (mechanical) sheet processing aggregate 13, wherein along with processing sheets in the above mentioned narrow sense in the further sense it can include the processing of sheet-like and plate-like material units 02.

Instead of or in addition to one or more of the mentioned mechanical processing levels S.2 (S.2;; S.2''), preferably in addition to the processing level S.2 of punching S.2, in advantageous design of the production plant 01 or of the production process P as a processing level S.2 acting mechanically on the material units 02.j, e.g. workpieces 02.j, or drums 04.j a spatial deformation S.3, in particular a folding S.3, of the e.g. already printed and/or coated and if necessary already cross-cut and/or punched workpieces 02.1; 02.1' is provided. In this connection the production plant 01 can comprise at least one aggregate 14 configured as a folding device 14 as a processing aggregate 14 for mechanical processing. With the design feature of folding S.3 the production plant 01 is preferably configured for manufacturing

printed and/or coated packaging products 03., i.e. printed and/or coated packages.

In one variant of the embodiment of the above designs in place of the single or multiple-level or multiple printing S.1 and/or coating S.1' a single or multiple or multiple reforming (S.2''; S.2'''), e.g. an embossing (S.2'') of the workpiece surface with an embossing device comprising an embossing tool or a corrugation (S.2''') of the workpiece 02.j still unprocessed or already mechanically processed once or multiple times can be provided with a corrugating unit comprising e.g. a grooved roller.

In an alternative to the above mentioned designs and variants of the embodiment or in their improvement in one advantageous embodiment in addition a single or multiple-level or multiple bonding S.4; S4' can be provided as a further processing level S.4' S.4' and a corresponding adhesive device 16; 17, as an aggregate 16; 17 or as a processing aggregate 16; 17. This can preferably be designed as an application of glue S.4 on tabs and/or an application of glue S.4' for window bonding within the scope of a manufacturing of e.g. products 03 configured as packing cartons or so-called trays. In the first case and/or the second the gluing device 16 can be combined with the folding device 14 into a common aggregate 14, 16; 14; 17; 14; 16; 17 or an aggregate group 14, 16; 14; 17; 14; 16; 17, e.g. a folding-gluing aggregate 14, 16; 14; 17; 14; 16; 17, and in the third case can be combined with a corrugating unit in a corrugated cardboard and gluing aggregate.

In addition to a punching S.2 or a punching device 13 and if necessary one or more of the above mentioned processing levels S1; S1'; S.2'; S.2''; S.2'''; S.3; S.4; S4' (S.4'') and/or

aggregates 11; 12; 14; 16 as a further processing level S.5 a breaking away S.5 on e.g. an aggregate 18, e.g. processing aggregate 18 for mechanical processing can be provided as an break away line 18, e.g. an automatic, semi-automatic or manual operating break away device 18.

A single run of an above mentioned processing level S.q; S.1; S.1'; S.2'; S.2''; S.2'''; S.3; S.4; S.4' (S.4'') defines a corresponding process step P.x; P.1; P.1'; P.2'; P.2''; PS.2'''; P.3; P.4; P4' (P.4''); P.5, in particular a processing step P.x; P.1; P.1'; P.2'; P.2''; PS.2'''; P.3; P.4; P4' (P.4''); P.5,, of the production process P required for manufacturing the specific product 03, in particular the overall process P. The same processing level S.q; S.1; S.1'; S.2'; S.2''; S.2'''; S.3; S.4; S.4', e.g. that of the printing S.1, can be run several times in succession in several process steps P.x.

For the above mentioned variants, modifications and improvements and for the subsequent designs the corresponding material units 02.0 or workpieces 02.0 to be processed - with the exception of the design with material units 02.0 manufactured from a material roll - are in principle in the original state material units 02.0 or workpieces 03 with any outer contour or any shaped and contoured full or hollow material. For the variants of the embodiment with process upward material units 02.0 manufactured from a raw material roll the workpieces 02.0 to be generated and further processed are also in principle workpieces 03 made of flat material with any shape, e.g. regular or irregular polygon shape, generally elliptical, or an irregular running outer peripheral contour.

In advantageous design for the above mentioned variants, modifications and improvements the material units 02.0; 02.j

are plate-like or sheet-like workpieces 02.0; 02.j, e.g. material plates 02.0; 02.j or material sheets 02.0; 02.j, preferably with a regular, in particular rectangular shaped outer peripheral contour. These plate-shaped or sheet-shaped workpieces 02.0; 02.j are characterized in particular by the fact that their thickness corresponds at the most by a fraction, e.g. at the most by a tenth, in particular at the most by a twentieth, to the shorter side in length and width. For example they have a thickness of at the most 20 mm, in particular a thickness of 0.03 mm to 10 mm. These e.g. plate-shaped or sheet-shaped material units 020; 02.j, e.g. workpieces 02.0; 02.j can in principle made of metal, plastic, wood, cardboard, paper or - e.g. with the exception of workpieces 02.0; 02.j made of raw material rolls - made of stone or glass. The plate-shaped or sheet-shaped workpiece 02.0; 02.j can for example - e.g. with the exception of a workpiece 02.0; 02.j made of raw material rolls - be configured as a material plate 02.0; 02.j, e.g. of a metal plate, a plastic plate, a cardboard or by cardboard with a thickness of e.g. more than 0.5 mm, e.g. between 0.5 and 20 mm, in particular between 0.5 and 10 mm, or else advantageously as material sheets 02.0; 02,j, e.g. as a metal plate, a plastic sheet, or in particular as a - if necessary precoated- cardboard - or paper sheet 03, wherein the thickness of such a material sheet 02.0; 02.j e.g. is at the most 0.8 mm, in particular ranging between 0.03 and 0.5 mm.

The material units 02.0, preferably in pieces, provided or to be provided for the same, specific order A(n) for multiple processing at least on the input side of the first processing level S.1 of the production process P are in a drum 04.0 or regularly in several drums 04.0. A drum 04.0 has a plurality (e.g. a number $z > 10$, advantageously $z \geq 50$, in particular z

≥ 100, with z p ϵ IN) of material units 02.0, in particular workpieces 02, of the same type (e.g. material) and/or of the same development (e.g. shape) and/or of the same processing status (e.g. still unprocessed). In the design of the drum 04.0 as a material roll or material web 04.0 it has a usable rollout length or length, which corresponds to the section length of the plurality, e.g. number z, of material sections 02.0 to be processed with the drum 04.0 - if necessary plus a security remaining length to be provided. For the preferred case of drums 04.0 configured as material stack 04.0, stack 04.0 for short, the stack 04.0 comprises the plurality, in particular the number z, of material units 02.0 comprised by the drum 04.0 in the form of stacked material sections 02.0, in particular material plates 02.0 or material sheets 02.0.

Preferably each specific order A(n) to be processed and/or currently in processing is uniquely named and identifiable by a unique designation a_n (with n ϵ IN), e.g. a unique product name and/or preferably by at least a so-called Job-ID a_n. In the process the designations a_n can be repeated over the course of time, however can never be simultaneously be processed with different orders A(n) provided with the same designation a_n in the plant 01 for processing or for delivery.

The drum 04.0 - related to the processing step P.x planned for the specific order A(n) - to be processed at the first processing level S.i; S.1 can be provided in a first variant on site not shown in the figures by cutting (S.0) from a larger raw material drum. This provided drum 04.0 will be or is then in a first transport process comprising one or more process steps fed from a dispensing position assigned to the cutting device e.g. configured as a guillotine trimmer, which can also be considered as an “entry point” for the drum 04.0

in the process P, via a homogeneous or heterogeneous first transport path of a advanced position 23 or of a buffer position 24 arranged upstream from this in the transport path of the processing level S.i first provided for the relevant order A(n), e.g. a printing S.1 or a coating S.1', or of the relevant aggregate 11; 12; 13; 14; 16; 17; 18, e.g. of a printing press 11 or of a coating machine 12.

As explained however, the material units 02.0 to be processed, e.g. to be printed or coated in the first processing level S.i; S.1 preferably already fed in respective drums 04.0 of the production plant 01 in the region of delivery and in a e.g. first transport process comprising one or more process steps P.y (e.g. if necessary repalletization, transport P.6, storage P.7, retrieval P.8, transport P.9, unpacking as conditioning P.10, relocation/repalletization as conditioning P.11 and/or transport P.12) from an entry position 21 to be attributed to incoming goods 06 via a homogeneous or heterogeneous, e.g. first transport path 22 or transport route 22 of the advanced position 23 or of a buffer position 24 if necessary arranged upstream of this advanced position 23 in the transport path 23 of the first processing level S.i, provided for the relevant order A(n), e.g. a printing S.1 or a coating S.1', S.1, or of the advanced position 23 or if necessary of a buffer position 24 of the relevant aggregate 11; 12; 13; 14; 16; 17; 18 arranged upstream of this advanced position 23, is fed e.g. to a printing press 11 or a coating machine 12. The buffer position 24 is located for example in the relevant transport route 22 and is e.g. operated/handled/managed by one or more transport means 65; 68; 69; 74; 79 assigned to this transport route 22 or this transport route section.

The drums 0.40 are fed to the production plant 01 in the area of incoming goods 06 e.g. in transport units 27 to be conveyed. In the process the drums 04.0 can if necessary form such a transport unit 27 with one or several drums 04.0 by themselves or with at least one further drum 04.0. Preferably however they are carriers 26 arranged individually or jointly in or on transport means 26, e.g. in containers or preferably as pallets 26, e.g. incoming goods - or format pallets 26, fed to incoming goods 06 and together with them forming the transport units 27 to be transported. In the process at least in the area of the incoming goods 06 several drums 04.0 can be combined for several orders A(n), in particular for several orders A(n) to be carried out with material units 02.0 of the same type and/or of the same characteristics, as a multiple drum with for example a total number of material sections 02.0 arising from the sum of the respective number z in the same transport unit 27 on the same transport means 26. Preferably however drums 04.0 commissioned for specific orders A(n) are already received by individual transport means 26, so that these can be separated over the further course in drums if necessary and transported. These can however first, e.g. at least in the area of incoming goods 06, be arranged next to or above one another combined in one transport unit 27.

After running through the first processing level S.1 provided for the product 03, the drum 04.1 with the material units 02.1, e.g. workpieces 02.1, that have been processed at least once, e.g. printed or coated, can in a further, e.g. second transport process comprising one or more process steps P.y (e.g. P. Transport 13) over a e.g. second homogeneous or heterogeneous transport path 28 be fed to a dispensing position 29 assigned to the output of the first running processing level S.i, e.g. the printing S.1, or assigned to

the output of the relevant aggregate 11; 12; 13; 14; 16; 17; 18 or to a buffer position if necessary arranged next to the dispensing position 29 on the aggregate side to a Advanced position 32; 33 or to a buffer position assigned to the aggregate of the at least one further processing level S.i+1, e.g. directly to a mechanical processing S.2 as second level or a previous coating S.1' as the second level, or to an input of the relevant processing aggregate 11; 12; 13; 14; 16; 17; 18; 11, e.g. the coating machine 12 or a processing aggregate 13 comprising e.g. a cutting tool, and/or and in a further, e.g. third transport process comprising one or more process steps P.y (e.g. transport P.14) via a e.g. third homogeneous or heterogeneous transport path 34 to a - scheduled or unscheduled - intermediate storage P.15 as a further process step P.15 to a buffer position 36, e.g. storage position 36, of a warehouse 37, e.g. buffer warehouse 37.

On a homogeneous or heterogeneous transport path not presented here explicitly the drum 04.1 processed once in processing level S.i can, prior to a processing in the next processing level S.q, from the output of the processing level S.i or after an intermediate storage P.15 from a buffer position 36 of the warehouse 37 in a next process step not shown in the figures, if necessary after a previous process step P. 16 of a conditioning P.16, in particular of a turning P.16 for example by means of a correspondingly configured aggregate 19, e.g. a turning device or conditioning device 19, for another processing in the same processing level S.i, e.g. the same or another processing aggregate 11; 12; 13; 14; 16; 17; 18 of this processing level S.i, be fed to the relevant processing aggregate 11; 12; 13; 14; 16; 17; 18.

If, in the previous description or the following description the advanced position 23; 32 or an aggregate side buffer position, at which the drum 04.j is dispensed from the transport route arranged upstream, and the working or contact position 31; 33, i.e. the position of the drum 04.0; 04.1 to be taken during operation for material feed, are far apart, a process step of an aggregate-internal transport to be attributed to the relevant aggregate 11; 12; 13; 14; 16; 17; 18 and an associated direction of transport, e.g. a coating route assigned to the aggregate 11; 12; 13; 14; 16; 17; 18 can be provided, which for example is controlled by a controller 98 (see below) assigned to the aggregate 11; 12; 13; 14; 16; 17; 18 and the relevant processing step P.x. The drum 04.0; 04.1 delivered at the advanced position 23; 32 or at a buffer position managed by the aggregate is then preferably adopted by the aggregate side conveyor device 103 (see below) and manipulated further. In this sense a delivery at the aggregate 11; 12; 13; 14; 16; 17; 18, unless explicitly differentiated, should be understood as the delivery at the advanced position 23; 31; 32; 33 active as the interface, which e.g. can be situated directly at the advanced position 31; 33 representing the working or contact position 31; 33, at a different advanced position 23; 32 and provided in addition to the contact position 31; 33 or the aggregate’s own buffer position if necessary. The advanced position 23; 31; 32; 33 defined such forms the interface 23; 31; 32; 33 between a transport means 60; 65; 68; 79 of the upstream transport rout 22; 38 (28; 34; 39; 54) and the input region of the relevant aggregate 11; 12; (13; 14; 16; 17; 18). The same is also on the output side of the relevant aggregate 11; 12; (13; 14; 16; 17; 18) for the provision of the drum 04.1; 04.2 with the material sections 02.1; 02.2 processed there for further transport at the delivery position 111 directly coinciding

with the dispensing position 29, at a dispensing position 29 spaced apart or a buffer position provided there if necessary, thus the provision at an interface representing an output between the aggregate 11; 12; (13; 14; 16; 17; 18) and a transport means 60; 65; 68; 79 of an adjoining transport route 28; 34; 39; 42; 43; 46 (48; 49). What has been described for the relevant interfaces at the input and output of the first and second aggregates 11; 12; (13; 14; 16; 17; 18) to be passed through is to be transferred analogously to one, several or all of the aggregates 13; 14; 16; 17; 18 provided in the plant 01.

In the advantageous design of the production plant 01 with the at least one buffer warehouse 37 for receiving drums 04.1; 04.1′ with material units 02.1; 02.1′, in particular workpieces 02.1; 02.1′ that have been processed at least once, e.g. printed and/or coated, is provided with a further, e.g. fourth homogeneous or heterogeneous transport path 38, via which in a e.g. fourth transport process comprising one or more process steps P.y (e.g. Transport P.17) a drum 04.1; 04.1′ intermediately stored at a storage position 36 of the buffer warehouse 37 of the advanced position 32; 33 or of the buffer position provided if necessary of the at least one further processing level S.i+1, e.g. a coating S.1′ of the material sections 02.1 which for example have not yet been coated or a mechanical processing S.2; S.2′, in particular punching S.2, of the previously printed and/or coated material sections 02.1 or of the advanced position 32 or of the buffer position 33 provided if necessary of the relevant further processing aggregate 11; 12; 13; 14; 16; 17; 18, e.g. of the coating device 12 or a processing aggregate 13; 14; 18 for mechanical processing, can preferably be fed to a processing aggregate 13 comprising a cutting tool. As far as the advanced

position or buffer position 32; 33 as an interface is concerned, the above mentioned is to be applied.

In the variant of the embodiment of the production process P or of the plant or, in which between the single or multiple printing S.1 and the (e.g. first) mechanical processing S.2 a coating S.1' lies, non designated transport paths for drums 04.1 of already printed material sections 02.1 from the output of the printing S.1 and/or from the warehouse 37 at the input of the coating S.1' and non designated homogeneous and heterogeneous transport paths for drums 04.1; of already printed and coated material sections 02.1' from the output of the coating S.1' for the (e.g. first) mechanical processing S.2 and corresponding advanced, dispensing and/or buffer positions are provided, at which in each case in one or more process steps, e.g. transport steps, the respective drums 04.1; 04.1' can be conveyed.

In an advantageous improvement of the production plant 01, in addition to the two processing levels S.q to be run in sequence or in addition to the at least one material application S.1; S.1' and the downstream mechanical processing S.2 (S.2'), which e.g. are assigned to a processing or in particular main processing section 51 of the plant 01, it comprises one or more e.g. processing levels S.i+2 e.g. to be run optionally of a further processing section 52. To this end preferably a further, e.g. fifth homogeneous or heterogeneous transport path 39 is provided, via which in a e.g. fifth, transport process comprising one or more process steps P.y (e.g. transport P.18) the drum 04.2 with material units 02.2 e.g. workpieces 02.2, processed at least twice, e.g. receiving an application and cut (out) or punched, is transferred from a dispensing position 41 assigned to the output of the second

run processing level S.i+1 or of the relevant aggregate 11; 12; 13 or from an if necessary buffer position provided there to an advanced position not shown in the figures for clarity's sake of if necessary a provided buffer position of the at least one of if necessary several processing levels S.i+2 or processing aggregates 14; 16; 17; 18 that can be run alone or in sequence. As one or more processing levels S.i+2 to be run individually or in sequence, e.g. one or more processing levels S.4; S.4' for joining, e.g. bonding of tabs and/or windows, and/or one or more processing levels S.5 for the breaking out of the uses from the previously punched material sections 02.2 can be provided. As one or more processing aggregates 14; 16; 17; 17 to be run individually or in sequence one or more folding devices 14 and/or one or more aggregates 16; 17 for joining, e.g. one or more gluing devices 16; 17, and/or one or more break away lines 18 can be provided.

In addition to the direct transport to the processing level S.i+2 or to the processing aggregate 14; 16; 17; 18 of the further processing section 52, a sixth homogeneous or heterogeneous transport path 46 can be provided, via which a drum 04.2 with material sections 02.2 processed e.g. twice or multiple times in a further, e.g. sixth transport process comprising one or more process steps P.y (e.g. Transport P.19) can be fed from the dispensing position 41 or from a buffer position provided there if necessary of a buffer position 36 of the above mentioned first buffer warehouse 37 and/or of a buffer position 56, e.g. storage position 56, of a further warehouse 57, e.g. buffer warehouse 57, to the process step P.20 of an intermediate storage P.20.

As far as the dispensing or buffer position 41 of the drum 04.2 with material sections 02.2 processed e.g. twice or multiple times, the above described about the relevant interface is also to be applied.

In advantageous design of the production plant 01 with the possibility of intermediate storage P.20 of the material sections 02.2 processed twice or completely in the main processing section 51 a further, e.g. seventh homogeneous or heterogeneous transport path 54 is provided, via which a drum 04.2; 04.2' intermediately stored at a storage position 36; 56 of the first or further buffer warehouse 37; 57 in a process step P.20 in an e.g. seventh transport process comprising one or more process steps P.y (e.g. Transport P.21) can be fed to an advanced position not shown for the sake of clarity or if necessary provided buffer position of the at least one of if necessary several processing levels S.i+2 that can be run alone or in sequence or of the at least one of if necessary several processing aggregates 14; 16; 17; 18 that can be run alone or in sequence.

Regardless of whether one or more processing aggregates 14; 16; 17; 18 or processing levels S.q of a further processing section 51 and/or one or more buffer warehouses 37; 57 are provided, in the process P downstream of the last processing process S.q of the plant 01 a packing level K and/or at least a further process step P.24, e.g. a packaging P.24 and/or palletization P.25 can be provided with one or more corresponding packaging- and/or palletizing devices 58; 59 shown here only by the corresponding reference number. The Packing level K or the further process step P.24; P.25 can comprise among others a shrinking device 59 or a shrinking as a process, by means of which the finished products 03 or a

drum 04.j comprising these can be provided with a film and packaged with it.

Depending on the embodiment of the plant 01 itself and/or depending the requirements for the product 03 to be produced, e.g. as a semi-finished product 03 (see e.g. Fig. 2a) or finished product 03 (see e.g. Fig. 2b) the processing section 53 after the main processing section 51, after an intermediate storage P.20 downstream of the main processing section 51 and/or after one or more downstream further processing levels S13; SP14; S16; S18; S18 and if necessary a downstream intermediate storage P20 material sections 02.j exiting as products 03 or the drum 04.j comprising them are in at least one transport process comprising one or more further process steps P.y (e.g. a direct transport P.22 without subsequent further processing and/or of a downstream further processing P.23) over at least one further homogeneous or heterogeneous transport path 43; 44; 46; 47; 48; 49 of the packing level K and/or in at least one further transport process comprising one or more process steps P.y (e.g. Transport P.26 and Storage P.27) via at least one further homogeneous or heterogeneous transport path 61 can be fed to a position 62, in particular a storage position 62 or a storage location 62, of a warehouse 63, e.g. finished products or outgoing goods warehouse 63. For example a corresponding transport P.26 from the packing level K or - excluding the packing level K - from the last processing level S.j to be run for the product 03 or the last intermediate storage P.15; P20 precedes the storage P.27.

Directly from the packing level K and/or preferably from the warehouse 63 the if necessary temporarily stored product drum 08 can be brought via a further homogeneous or heterogeneous transport path 64 in a further transport process in comprising

one or more process steps P.y (e.g. retrieval P.28, relocation, repalletizing P.29 and/or transport P.30) from the storage location 62 to the outgoing goods 07. This can happy by retrieval P.28 and a subsequent transport 30. Within the warehouse 63, depending on the requirements a single or multiple relocation can occur in the meantime.

The warehouses 09; 37; 57; 63 can in each case be configured in principle in different and random embodiment types, e.g. as high-rise storage, level storage, high shed storage system, tower storage, paternoster warehouse or floor warehouse, for receiving the respective drums 04.1; 04.2 or of the transport units 27; 66; 67; 108; 109 comprising the respective drums 04.1; 04.2; 08 to be stored. However, preferably they are designed to be automated with respect to their storage and retrieval and comprise an interface by means of which a corresponding storage and/or retrieval request can be transmitted.

In one preferred design however the incoming goods warehouse 09 is configured as a high-rise storage 09 with at least one shelf row 72 comprising a plurality of storage locations 71 on both sides of a travel lane 73 of at least one transport means 74 configured e.g. as a stacker crane 74.

In preferred design, the outgoing goods warehouse is configured as a high-rise storage 63 with at least one Shelf row 76 having a plurality of storage locations 62 on both sides of a travel lane 77 e.g. running in a shelf aisle of at least one manipulation means 78, e.g. a transport means 78 configured as a stacker crane 78. As presented, preferably several, e.g. two, parallel running shelf halls are provided

with shelf rows 76 in each case on both sides and travel lanes 77 for e.g. two storage retrieval units 78 each.

The incoming goods and outgoing goods warehouses can be configured as warehouses 09; 63 structurally separate from one another or as two warehouse areas 09; 63 spatially separate from one another of a common warehouse 09; 63, e.g. incoming goods and outgoing goods warehouses 09; 63. In a variant of the embodiment not presented here the two warehouses 09; 63 can also be storage locations 62; 71 that can be variably assigned to the one or other "warehouse" of a joint raw materials and product warehouses 09, 63.

In one preferred design of the incoming goods warehouse 09 and/or of the outgoing goods warehouse 63 it is designed with a warehouse area comprising storage locations 62; 71, whose extension in a longitudinal direction corresponds to a multiple, in particular at least triple of the extension in the width. In one presented advantageous design the incoming goods warehouse 09 and outgoing goods warehouse 63 run side by side on a longitudinal side.

In addition to or considered separately, in one preferred design the incoming goods warehouse 09 and the outgoing goods warehouse 63 are oriented in the plant 01 such that with their longitudinal direction, i.e. with the direction of greater extension and/or of the course of the travel lane(s) 73; 77, inclined at least predominantly in, i.e. less than 45° or preferably essentially (e.g. with at the most ± 10° deviation) they run parallel to the central material flow direction from the first processing aggregate 11; 12; 13; 14;16; 17; 18 to the input in the packing level K. In this connection e.g. as the central material flow direction a

direction is understood averaged over all connecting lines of possible entry points in the first processing level S.1; S.1' with the possible entry points in the packing level K. In addition to or considered separately, in an advantageous design the outgoing goods warehouse 63 has in the region of an end viewed in the longitudinal direction the input for the storage and in the region of the other end the output for the retrieval of the product drums 08. In addition to this or considered separately, in an advantageous design the input for the storage of the raw material drums 04.0 is located in the incoming goods warehouse 09 and the output for the retrieval of the product drums 08 is located in the region of a side of the respective warehouse 09; 63 or of the warehouse area 09; 63 pointing in the same direction.

The transport of the drums 04.0 from the incoming goods warehouse 09 over the transport path 22 to the first processing level S.1; S.1' to be run - preferably over at least one process step P.10; P.11 of a conditioning P.10; P.11 - can occur from the manipulation means 74 of the warehouse 06 by means of one or more manipulation means 68; 59 of the same or different type. For example, the drum 04.0 can be passed by the manipulation means 74 of the warehouse 06 directly to a transport means 65; 68; 79 e.g. configured as a transport vehicle 65; 68; 79 as a manipulation means 65; 68; 79. In a design indicated here the drum 04.0 is first dispensed by the manipulation means 74 of the warehouse 06 to e.g. a transport means 69 configured as a conveyor device 69, which is for example designed as a roller conveyor 69. From a transfer point the drum 04.0 is then for example picked up by a transport means 60; 65, in particular configured as a driverless transport means, e.g. a mechanically guided transport vehicle 65, for example a so-called shuttle car 60

or a transport vehicle 65; 68; 79 guided in a non-contact manner, e.g. as a transport means 60; 65; 79 configured as a driverless industrial truck 65; 68; 79 and - preferably over at least one process step P.10; P.11 of a conditioning P.10; P.11 - brought to the first processing level S.1; S.1' to be passed through.

The transport of the drum 04.0j between the processing aggregates 11; 12; 13; 14; 16; 17; 18 among themselves and/or the buffer warehouses 37; 57 (if provided) can occur in principle by means of any configured manipulations means 65; 68; 79. To obtain a greater flexibility transport here occurs preferably by means of one or in particular several transport means 65; 68; 79 e.g. configured as transport vehicles 65; 68; 79, in particular transport or industrial trucks 65; 68; 79 guided in a non-contact manner.

The material throughput is decoupled between two processing steps P.x by means of the buffer warehouse(s) 37; 57.

The first and/or the second buffer warehouse 37; 57 can in principle be randomly arranged, e.g. in an especially compact variant being integrated as a warehouse area in the incoming goods warehouse and/or in the outgoing goods warehouse 09; 63. However, advantageously the first and/or the second buffer warehouse 37; 57 is configured as a different warehouse 37; 57 than the incoming goods warehouse or the outgoing goods warehouse 09; 63 and/or at least partially arranged between two succeeding processing levels S.i; S.i+1.

For the case of two buffer warehouses 37; 57 these can be configured as areas of a joint warehouse 37; 57, however are preferably in each case spatially optimized as separate

warehouses 37; 57, e.g. at least partially arranged between two succeeding processing levels S.i-; S.i or Si., S.i+1 provided in the plant 01.

For the case of one or more buffer warehouses 37; 57 they can - depending on their type - operated for their storage and retrieval in principle by differently configured manipulation means 79. In one preferred design however the first and/or the second buffer warehouse 37; 57 are configured as operable floor warehouse 37; 57 configured by means of manipulation means 65; 68; 79, for example transport means 65; 68; 79 configured as transport vehicles 65; 68; 79, in particular industrial trucks 65; 68; 79.

Advantageously the first and/or second buffer warehouse 37; 57 is designed with storage locations 36; 56 in series arrangement with travel paths running in between, but not shown here and therefore facilitating a good access to a plurality of different storage locations 36; 56 and thus to drums 04.1; 04.2 with material sections 02.1, 02.2 which are assigned different orders A(n).

In principle transport can take place on all transport paths and transport path sections to be operated by mechanically non-guided transport vehicles by means of conventional industrial trucks 65; 68; 79 preferably driverless guided, configured as forklift vehicles 65; 68; 79. In particular, in the region of the incoming goods 06 and/or the transport P.9; P.26; P.30 upstream of the unpacking P.10 and/or downstream of the packing P.25 can occur or be configured with conventional driverless industrial trucks 65 configured as forklift vehicles 65; 68; 79 (see e.g. Fig. 10). The transport means 65 is then e.g. designed with counterweight (i.e. without

operative floor contact in the region of the load bearing during the transport).

Also in the region of the incoming goods 06 and in at least one transport section between the packing level and the outgoing goods 07 a transport P.26; P.30 can occur by means of a conventional industrial truck designed in particular as a driverless guided industrial truck 65 with e.g. counterweight (i.e. without floor contact in the region of the load bearing during the transport). This also applies for return transports of empty transport means 108; 109.

Between the unpacking P.10 and e.g. a packing P.24, however, at least between the exiting of the first processing level S.1 and a transfer to the advanced position 32 of the second processing level S.2 or preferably a transfer to the advanced position 32 of the third processing level S.3 the transport P.12; P13; P14; P.17 occurs preferably by means of a transport means 79; 68 configured with a device 75 securing the drum 04.j or the transport unit 66; 67 on the top, for example a transport vehicle 79; 68, in particular an industrial truck 79. The device 75 for load restraint can for example be configured as one or more lowerable clamping elements 75 on the top of the removed drum 04.j or of the received transport unit 67; 66, e.g. one or more Clamping platen (see e.g. Fig. 10 b) and c). The industrial truck 79; 68 comprising the load restraint is preferably in the region of its gripper arm - e.g. in contrast to conventional lift truck forks - for example designed via rollers with a supporting floor contact and therefore requires no additional space-consuming arrangement with corresponding counterweight.

In one advantageous design the transport P.9 occurs at least on a transport section between the retrieval P.8 at the incoming goods warehouse 09 and the unpacking P.10 by means of a driverless transport vehicle 60; 68, which in a first variant of the embodiment can be formed by a driverless transport vehicle 60; 68, e.g. a multiple conveyor 68, e.g. double conveyor 68. This can additionally comprise one or more devices 75 for position stability (see e.g. Fig. 10 c). The multiple conveyor 68 is preferably designed in the region of its gripper arms - e.g. in contrast to conventional lift truck forks - for example designed via rollers with a supporting floor contact and therefore requires no additional space-consuming arrangement with corresponding counterweight. In the second variant of the embodiment the driverless transport vehicle 60 is formed as a mechanically guided driverless transport vehicle 60 which for example moves along a guide between one or more transfer positions at the incoming goods warehouse 09 and one or more transfer positions from adjoining aggregates 19; 11 downstream in process P.

Transport paths 22; 28 34; 38; 39; 42; 43; 44; 46; 47; 48; 49; 54; 61; 64; 116; 117 or their sections, which in a design for the transport (P.6; P.9; P12; P.13; P.14; P.17; P.18; P.19; P.21; P.22; P23; P 30 are driven or should be driven or configured with a driverless transport vehicle 60; 65; 68; 79, comprise conduction means, by means of which the corresponding movement paths or lanes are defined. These can be in the design of mechanically guided transport vehicles 60; 65; 68; 79 formed by mechanical guides, e.g. rails, and in the case of transport vehicles 60; 65; 68; 79 guided in a non-contact manner by contactless sensors, e.g. in electromagnetic manner (e.g. optically or magnetically) or in acoustic manner (e.g. ultrasound) perceivable orientation aids along the relevant

transport path, in particular in conjunction with driving routes and/or sections stored in the means of the associated transport means controller.

The processing aggregates 11; 12; 13; 14; 16; 17; 18 present in the sense of processing stations comprise e.g. in each case at least one processing tool 81; 82; 83; 84; 86; 87; 88, e.g. the printing press 11 provided by way of example at least one printing unit 81, the coating machine 12 provided if necessary at least one coating device 82, e.g. a coating unit or hot embossing unit, the punching device 13 provided by way of example a die cutting unit- and/or creaser 83 comprising a punch tool, the folding device 14 provided by way of example a folder/folding device 84 with e.g. if necessary an adhesive device 86 of an adhesive device 16, the adhesive device 17 provided by way of example for bonding S.4' of e.g. windows an adhesive device 87 and/or a break away device provided if necessary a break away tool 88. For two successive productions of orders A(n) with products 03 differing in surface design, in texture and/or shape the processing tools 81; 82; 83; 84; 86; 97; 88 of one or more of the processing aggregates 11; 12; 13; 14; 16; 17; 18 to use are to be retrofitted and/or set up for the new production. For example this can be a change of printing forms, a change of a coating subject, a change of a punch and/or embossing mold, a positioning of a folding blade and/or of a glue head and/or an exchange or an adjustment of a break away punch.

This retrofitting/setup of processing aggregates 11; 12; 13; 14; 16; 17; 18 occurs e.g. during a production interruption. If necessary, some of or the same processing levels S.q can run a different production parallel to retrofitting to other processing aggregates 11; 12; 13; 14; 16; 17; 18.

In one especially preferred design of the plant 01 at least one of the processing levels S.q or at least one of the processing aggregates 11; 12; 13; 14; 16; 17; 18, in particular an aggregate 11; 12 for a material application S.1; S.1', in particular for printing S.1, and/or a (e.g. first) aggregate 13 for mechanical processing S.2, at least on the input side with means and/or a device for automatic and/or interruption-free material feed 89, e.g. an interruption-free feeder 89, while a so-called stack change or better stack replenishment and preferably on the output side with means and/or a device for automatic and/or interruption-free material removal 91, e.g. an interruption-free stacker 91 during an output side stack change or a stack removal (see e.g. Fig. 3). As a result an interruption-free processing of an order A(n) is possible by the relevant aggregate 11; 12; 13; 14; 16; 17; 18, in particular the aggregate 11; 12 for material application S.1; S.1' and/or e.g. the following aggregate 13 for mechanical processing, whose scope is formed or will be formed by the material sections 02.0; 02.1; 02.2 of a plurality of drums 04.0; 04.1; 04.2.

In the preferred variant of the embodiment of the plant 01, in which at least one of the processing aggregates 11; 12; 13; 14; 16; 17; 18 can be fed the material in the form of drums 04.j of plate-shaped or sheet-shaped material sections 02.j configured as stacks 04.j free of interruption, the device 89 configured in this connection e.g. as a feeder 89 has by way of example a lifting device not described in detail with a supporting device 92 that can be moved vertically by a drive, e.g. a lifting platform 92, through which a stack 04.j in a contact position 31; 33 can be conveyed upstream during the material removal above by corresponding conveyor devices, e.g.

gripping devices, so that the removal height of the highest of the material sections 02.j is always preserved (see e.g. Fig. 4, step 1 and 2). Further the device 89 comprises a second lifting device with a supporting device 93 that can be moved vertically by a drive, e.g. a so-called fork 93 or a so-called rake 93, which in a first working height can be brought horizontally between the supporting device 92 of the first lifting device and the lower end of the stack 04.j carried by the supporting device 92. By means of this second lifting device the remaining partial stack or in particular remaining stack 04.j received by the supporting device 93 can be conveyed upstream during the material removal above by corresponding conveyor devices, e.g. gripping devices, so that the removal height of the highest of the material sections 02.j continues to be preserved (see e.g. Fig. 4, step 3). The supporting device of the first lifting device can then be moved back to its lower receiving position, so that it - while the material feed is guaranteed via the residual stack - can receive a next stack 04.j+1. After a new stack 04.j' has been brought to the contact position 31; 31 to the supporting device 92 of the first lifting device, it can be moved vertically until the upper end of the stack 04.j' has reached the lower end of the remaining stack 04.j. Finally the second supporting device 93 can be removed from the stack again for example by horizontal movement and brought back to the height for the lower situated first working height.

The means for automatic and/or interruption-free material feed 89 hence comprise in preferred design at least the second lifting device with the vertically movable supporting device 93 and its vertical drive. So that the stack 04.j can be taken without disturbance from the supporting device 93, its design and/or arrangement as well as those of the system transport

means 108, in particular in the region of its Support surface 131, can be designed corresponding to each other functionally such that a non-destructive acceptance of a stack 04.j by the supporting device 93 is possible. For example, the distances and the depth of the recesses 126 and the distances and the height of the prongs (supporting elements) can be coordinated to one another such that the latter can be inserted from the side with the stack 04.j lying upon it into the recesses 126 without damaging the bottom layer of the stack 04.j.

In the preferred variant of the embodiment of the plant 01, in which the processed material in the form of drums 04.j+1 of plate-shaped or sheet-shaped material sections 02.j configured as a stack 04.j can be conducted away interruption-free from at least one of the processing aggregates 11; 12; 13; 14; 16; 17; 18, the device 91 configured in this connection e.g. as stacker 91 has for example a lifting device not described in detail with a supporting device 94 that can be moved vertically by means of a drive, e.g. a lifting platform 94, through which a stack 04.j+1 formed by the processed material sections 02.j+1 in a contact position 111; 112 while the material support occurring by means of a corresponding conveyor device 97, e.g. a continuous conveyor 97 comprising gripping devices can be conveyed downward, so that the storage height of the uppermost of the material sections 02.j+1 is always preserved (see e.g. Fig. 5, 1.,2.). The device 91 comprises further a second lifting device with a supporting device 96 that can be moved vertically by a drive, e.g. a so-called board 96, or preferably a so-called stacking table 93, which in a first working position can be brought horizontally between at least an upper part of the stack 04.j+1 already formed and the conveyor device 97, preferably however between the top layer of the stack 04.j+1 formed by that time and the

conveyor device 97. By means of this second lifting device in its working state by receiving the following material sections 02.j+1; a new stack 04.j+1' to be formed can be supported while the supporting device 94 removes the previous stack 04.j+1 formed below. Thus during the removal of the one stack 04.j+1 the receiving of the processed material sections 02.j+1' in a new stack 02.j+1' is further guaranteed. After the previous stack 04.j+1 has been removed from the delivery position 111; 112, the supporting device 94 of the first lifting device can be moved vertically again until it has reached the lower end of the new stack 04.j+1' and supports it. Finally, the second supporting device 96 can be removed from the stack 04.j+1 again, for example by horizontal movement, and be brought back to the height for the higher situated first working position.

In principle, the drums 04.j; 04.j+1 can be fed to or conducted away from the processing levels S.j or aggregates 11; 12; 13; 14; 16; 17; 17 separately as transport units 04.j; 04.j+1. In the advantageous design presented here however these are fed to and/or conducted away from the processing aggregates 11; 12; 13; 14; 16; 17; 18 on transport means 26; 108; 109 already mentioned above or different transport means as transport units 27; 66; 67 at least of the processing level of printing S.1 and/or the first mechanical processing S.2. In especially preferred design the drums 04.j; 04.j+1 are fed to and/or conducted away from the relevant processing aggregates 11; 12; 13; 14; 16; 17; 18, in particular at least of the processing level of printing S.1 and/or of the first mechanical processing S.2, in or on transport means 108, e.g. in containers or preferably on carriers 108 preferably configured as pallets 108, which are different from those transport means 26 in the delivery at the incoming goods 06

and from further transport means 109 used for storage in a variant of the embodiment if necessary in the incoming goods warehouse 09 and from transport means 121 forming transport units 124 for delivery of goods in a variant of the embodiment if necessary in the outgoing goods 07 and/or which only circulate in the plant 01 as system transport means 108. To this end in the transport path 22 between the delivery at the incoming goods 06 and the processing aggregate 11; 12; 13; 14; 16; 17; 18 of the first processing level S.j to be provided via the system transport means 108 at least one aggregate 118; 119 configured as a manipulation aggregate 118; 119, e.g. a turning and/or conditioning device 118; 119 is provided, by means of which or with the assistance of which the stack 04.j to be fed can be brought to such a system transport means 108.

The system transport means 108 for input side provision of the at least one processing level S.j, e.g. for providing the at least one printing unit 11 and the at least one first mechanical processing aggregate 13, in the region of its contact surface for the material sections 02.j to be processed with support elements of the supporting device 93 configured e.g. fork-like or rake-like of the device for interruption free feed 89 is provided with corresponding recesses 126 so that the supporting device 93 with its support elements for transfer of a stack 04.j between bars 127 of the system transport means 108 - without first protruding over the support plane formed by the top of the bars 127 of a support surface 131 provided for receiving the stack 04.j - and a stack 04.j lying upon it can be inserted. The recesses 126 are e.g. designed as groove-like slots 126 or recesses 126 (i.e. column) in the support surface 131 provided by the support plane. The groove-like recesses 126 run with their longitudinal direction preferably parallel to a shorter of the

two side lengths l108; b108 of the support surface 131 of the system transport means 108 provided for receiving stacks 04.j and/or in the material removal direction M of the transport unit 67 or 67j positioned in operation at the advanced position 31; 33. The transport unit 67.j can in the process be formed by the system transport means 108 and a stack 04.0; 04.1; 04.j supported by it of unprocessed material 02.0; 02.1; 02.j, of said material processed once, or j-times. Preferably a large number of, e.g. at least 8 such recesses 126 are provided running parallel next to one another over the width provided for the delivery of the material sections 02.j. For example, at least one recess 126 and one web 127 are provided for each 0.25 m of the width provided for the delivery of the material sections 02.j. A plurality of webs 127 and/or recesses 126 have a width of e.g. at the most 100 mm.

The recesses 126 run on at least one side up to the end face of the system transport means 108, so that the corresponding support elements, e.g. notches of the for example fork-like or rake-like configured supporting device 93 of the device for automatic and/or interruption-free material feed 89 can dip in from this side of the system transport means 108. On the opposing end face side the recesses 126 can be designed open or closed.

In the base area of the transport means 108 e.g. designed as a system pallet 108 it has at least two feet 128, upon which the transport means 108 can be placed on a subfloor and between which a recess 129 is provided, into which at least one support element of a transport means 79, e.g. a prong of an industrial truck 79, can engage in order to receive the transport means 108. For example, on each of the four sides of a base area, e.g. substructure 123, at least one such recess

129 is provided. Advantageously, a third foot 128 is provided between two feet 128 on the end side of the same side which on both sides is spaced apart by one recess 129 each from the end side feet 128.

The system transport means 108, at least however a support panel 122 comprising the webs 126 and recesses 127, e.g. a single or multiple part cover plate 122 of the system transport means 108 for interruption-free material feed, is preferably plastic, in particular made of PET.

In one design of the plant 01 or of the production process P the stack 04.j to be fed to the processing aggregate 11; 12; 13; 14; 16; 17; 18 of the first processing level S.j to be supplied via the system transport means 108 is fed on the transport means 26, on which it was supplied in the incoming goods 06. In a manipulation aggregate 118 configured for example as relocating and/or turning device 118, in particular as a stack turner 118, the stack 04.j is freed from its previous, i.e. original transport means 26 and placed on the system transport means 108. In one advantageous design during the shifting - if necessary under impact with an air stream and/or a shaking - an alignment of the plate-like or sheet-like material sections 02.j can occur. In the stack turner 118 the original transport means 26 can be removed and replaced by the system transport means 108, and the transport unit 67 (67.0) formed thus comprising the stack 04.0 can be made directly available for further process or fed to the incoming goods warehouse 06 for a preliminary storage. The repalletizing P.11 performed with the assistance of the manipulation aggregate 118 can be provided directly in the region of incoming goods 06 or for the first case also between

warehouse 06 and the first processing level S.j to be supplied.

In a design especially preferred for large plants 01 the repalletizing P.11 of the delivered drum 04.0 takes place by means of this manipulation aggregate 118, however, not directly from the transport means 26 upon which it was delivered in the incoming goods 06, on the mentioned system transport means 108 configured for interruption-free material feed, but rather via an upstream process step P.31, namely a repalletizing P.31, e.g. a relocation P.31 of the drum 04.0 or placement of the transport unit 27 comprising the drum 04.0 on a standardized transport means 109, i.e. a transport means 109 of defined dimensions, hereinafter also referred to as standard transport means 109. Together with the drum 04.0 and if necessary the transport means 26, this standard transport means forms a transport unit 66 e.g. to be conveyed to the manipulation aggregate 118 and/or first to be stored in the incoming goods warehouse 06.

The standard transport means 109 can for example be provided as a further pallet 109, e.g. system pallet 109, only circulating in the plant 01, or if necessary as an international standardized pallet 109 with respect to dimensions, e.g. standard pallet 109 for example as a so-called ‘Europallet’ or a so-called ‘industrial pallet’. In particular in the design as a further system pallet 109 this can correspond at least in the dimensions of its support surface 132 to those of the system pallet 108 first mentioned. However, with regard to the surface structure and/or the material used and/or the tolerances specified as permissible it can be less elaborately designed. For example, the support surface 132 can be configured e.g. of top boards running in

the direction of the greater of the two side lengths l109; b109. In another design it can - e.g. as an injection molding part - be made of plastic, however without the plurality of slots in the support surface 132 open on at least one side, running in the direction of the shorter side corresponding to the support elements of the device 89.

The relocation or positioning P.31 on the transport means 109 of defined dimensions occurs e.g. directly in the incoming goods 06 in the acceptance or in the transport path 22 between incoming goods 06 and the incoming goods warehouse 09 for example by means of an aggregate 119 configured to this end, e.g. manipulation aggregate 119. This can be a manipulation aggregate 119 configured as holding and/or relocation station 119. In the case of the placement of the transport unit 27 comprising the drum 04.0 on the transport means 109 the subsequent transport and/or storage of the drum 04.0 occurs on the original and further transport means 109. In the subsequent repalletizing with the assistance of the manipulation aggregate 118 both transport means 26; 109 are then removed and replaced by the system transport means 108 configured for interruption-free material feed.

In the transport path 22 from incoming goods 06 to the repalletizing P.11 on the transport means 108 for the manipulation aggregate 118 (see e.g. in Fig. 1 with transport paths indicated) bringing about or supporting the interruption-free material feed a further aggregate configured as a conditioning device, for example an unpacking aggregate, can be provided, by means of which or with the assistance of which an unpacking P.10 occurs during repalletizing P.11 and/or with the assistance of the manipulation aggregate 118

bringing about or supporting the interruption-free material feed on the transport means 108.

In the manipulation aggregate 118 the stack 04.j in this design is now liberated from its previous, i.e. at least the standard transport means 109 and if necessary the as yet not removed original transport means 26 and placed on the system transport means 108.

The original transport means 26 if necessary only removed on the manipulation aggregate 118 are e.g. extracted from there over a transport path not described in greater detail - for example for disposal - from the plant 01 (see e.g. in Fig. 1 the transport path indicated with the circles that are not filled in).

For the case that the above mentioned standard transport means 109 are used for the storage in the incoming goods warehouse 06 and/or for the transport to the manipulation aggregate 118, they can be conveyed individually or preferably combined in groups for example in a stack 133 from a return position on the manipulation aggregate 118 upstream (as far as the material flow is concerned) to the holding and/or relocation station 119 and or downstream to a delivery or advanced position 111; 112; 114 of a subsequent processing aggregate 11; 12; 13; 14; 16; 17; 18 in the process P, e.g. of a processing aggregate 11; 12; 13; 14; 16; 17; 18 of the first, second or further processing level S.1; S.1'; S.2; S3; S4; S.4'; S5, (see e.g. in Fig. 1 the transport paths indicated with the broken double lines).

For the case that the material sections 02.j of the drum processed once or multiple times should be received on the

output side on a transport means 26; 109; 108; 124 transport means 26; 109; 108; 124 can be placed on the relevant processing aggregate 11; 12; 13; 14; 16; 17; 18 on the output side, in particular e.g. at least on its delivery position 111; 112.

These can in the simplest case of the plant 01 be formed in a first variant by transport means 26, which have originally received drums 04.0 in the delivery and after the removal of the material sections 02.j have been brought empty for their processing to the relevant delivery position 111; 112, or in a second variant be formed by transport means 124 which are also provided downstream at the outgoing goods 07 for receiving finished product drums 08.

In one advantageous design of the plant 01 with the drums 04.0 before storage P.7 in the incoming goods warehouse 06 and/or before the first processing direct or indirect standard transport means 109 these standard transport means 109 can be brought after emptying, which can take place e.g. on the provided manipulation aggregate 118 by repalletizing P.11 or by material removal on the input side of a first processing aggregate 11; 12; 13; 14; 16; 17; 18 to the relevant delivery position 111; 112 of the first or of a downstream processing aggregate 11; 12; 13; 14; 16; 17; 18.

In the especially advantageous design of the plant 01 shown here a repalletizing P.11; P.31 of the material sections 02.0 of the delivered stack 04.0 occurs at least once on a system transport means 108 for an interruption-free material feed at at least one of the processing levels S.j or processing aggregates 11; 12; 13; 14; 16; 17; 18. On the output side this processing aggregate 11; 12; 13; 14; 16; 17; 18 configured for

interruption-free material feed can in principle in the above mentioned manner be fed an original transport means 26, a standard transport means 109 or a transport means 24 that can also be used for outgoing goods 07.

In an improvement of the plant 01 or of production P to be preferred downstream of the at least one processing level S.j with the at least one processing aggregate 11; 12; 13; 14; 16; 17; 18 configured for interruption-free material feed, e.g. of a printing unit 11, a further processing level S.j with at least one processing aggregate 11; 12; 13; 14; 16; 17; 18 configured for interruption-free material feed, e.g. a punching device 13, is provided. On the output side of the processing aggregate 11; 12; 13; 14; 16; 17; 18 of the first processing level S.j configured for interruption-free material feed (in particular S.1) a system transport means 108 configured for the interruption-free material supply is then fed. These empty system transport means 108 required at the output can in principle for example come from the input side of the same aggregate 11; 12; 13; 14; 16; 17; 18 or preferably - for example via an intermediate storage of - from a downstream aggregate 11; 12; 13; 14; 16; 17; 18 (see e.g. in Fig. 1 the transport paths indicated by the broken solid line). In the region of the first processing aggregate 11; 12; 13; 14; 16; 17; 18 to be supplied with drums 04.j on system transport means 108 the system transport means 108 becoming free in the input region are preferably - at least to a large extent - conveyed back to the manipulation aggregate 118; 119. This happens in the empty state e.g. individually or preferably in groups for example in a drum 134, e.g. a stack 134, combined from e.g. a collecting and/or return station 136 to the manipulation aggregate 118. The collection and/or return can occur in a collecting and/or transport frame only

roughly indicated in Fig. 9. To obtain a suitable orientation of the empty system transport means for the manipulation aggregate 118 for example configured as a stack turner 118, on the transport path, e.g. in an access region of the collecting and/or return station 136, a turning aggregate 137 can be provided as manipulation aggregate 137 for turning transport means 108, in particular of system transport means 108.

The system transport means circulating over one or more processing levels can - at least in part -combined in the empty state also individually or in groups, for example in a corresponding drum not shown in the figure, e.g. a stack from e.g. a downstream collecting and/or return station, be returned to the output of an upstream processing aggregate 11; 12; 13; 14; 16; 17; 18. The collection and/or returning can occur in a collecting and/or transport frame not shown in the figure, wherein for this purpose turning can be omitted.

However, if such system transport system means 108 are returned to the stack turner 118, a turning aggregate can also be provided on the transport path, e.g. in an access region of the collecting and/or return station, as a manipulation aggregate for turning transport means, in particular system transport means.

In the design as a stack turner 118 the manipulation aggregate 118 is designed to pivot a stack 04.j inserted into it in upright state around a horizontal pivot axis by more than 90°. In the process, the frame of the stack turner 118 can be designed such that the (imaginary) swivel axis runs through the stack profile or next to it. Preferably the pivotable part of the stack turner 118 comprises a contact surface interacting with a lateral side of the stack 04.j, in

particular two contact surfaces interacting with two adjacent lateral sides of the stack 04.j above the corner. The pivotable part or at least one of the contact surfaces can be designed in an improvement with a mechanism for shaking and/or with a mechanism for blowing air.

In the previous description and in the following of course the more special expression related to "pallet" can take the place of the sometimes more general formulation "transport means" 26; 108; 109 sometimes or consistently.

The repalletizing P.11 occurs for example by first bringing the transport unit 66; 67 comprising the drum 04.0 and the original transport means 26 and/or the standard transport means 109 into the stack turner 118, pivoting it by an angle greater than 90°, removing the original transport means 26 and/or the standard transport means 109, providing the free stack end with the system transport means 108 and finally swiveling the stack 04.0 or the newly formed transport unit 67 comprising said stack back to its upright position. During this cycle - e.g. before equipping with the system transport means 108 - a shaking and or blowing can occur with the mentioned pivot angle or a different one of at least 20° and less than 160°.

If no unpacking station is provided as a separate aggregate, an unpacking P.10 can occur during the repalletizing P.11 and/or in the stack turner 118. To this end e.g. in the above described cycle after introduction of the stack 04.0 or the transport unit 27; 66 comprising the stack 04.0 first the packaging, e.g. a protective film and/or a protection made of packing paper or cardboard is removed.

In one advantageous design of the production plant 01 several aggregates 11; 12; 13; 14; 16; 17; 18; 118; 119 spaced apart from one another and involved in the conditioning and/or processing of the material sections 02.j or drums 04.j and/or a controller 98 (99, 101, 102) as a subset (in particular of the same level S.q) of the available aggregates 11; 12; 13; 14; 16; 17; 18; 118; 119 of the plant 01 as a group on site, i.e. decentralized in the plant 01 and/or e.g. with a view of the associated aggregate 11; 12; 13; 14; 16; 17; 18; 118; 119, indicated in Fig. 1 in each case with reference number 98, in particular differing or spaced apart from a planning and/or control system 139 from a controller, are assigned, via which the aggregate 11; 12; 13; 14; 16; 17; 18; 118; 119 is controlled and/or operated. This can be one or several control means connected to one another by means of electrical signals, e.g. a machine controller and if necessary one or more further control computers or control circuits, as well as one or more operator interfaces 99; 101; 102, e.g. a control station 99 and if necessary an input side or output side operating element 101; 102, via which the respective assigned aggregate 11; 12; 13; 14; 16; 17; 18; 118; 119 or the aggregates 11; 12; 13; 14; 16; 17; 18; 118; 119 of the respective group can be controlled and/or operated by the operating personnel on site. A multiple aggregate 14, 16 should also be understood as an aggregate as described in an above mentioned variant of the embodiment for an aggregate 14, 16 integrating a folding device 14 and a gluing device 16, and in which the integrated aggregates 14; 16 are not supplied separately from each other with corresponding material sections 02.j (or workpieces 02.j). A group of aggregates 11; 12; 13; 14; 16; 17; 18; 118; 119 can for example be aggregates 11; 12; 13; 14; 16; 17; 18; 118; 119 of the same processing type, i.e. the same processing level S.j, which can be controlled and operated by a joint

controller 98 (99, 101, 102), in particular by the same control station 99. Hence the individual aggregate 11; 12; 13; 14; 16; 17; 18; 118; 119, in particular the processing aggregates 11; 12; 13; 14; 16; 17; 18; 118; 119 can be operated and managed on site and in principle separately from one another as separate machines.

In principle independently from, however preferably together with the above mentioned device 89 for interruption-free material supply and/or the device 91 for interruption-free material removal on the input side of one or more of the processing aggregates 11; 12; 13; 14; 16; 17; 18, in particular at least of the processing aggregate(s) 11; 12; 13; 14; 16; 17; 18 configured as a printing press(es) 11 and/or the processing aggregates 11; 12; 13; 14; 16; 17; 18 configured as the first mechanical processing aggregate(s) 13 (e.g. punching device(s) 13, a conveyor device 103 already mentioned above, assigned to the processing aggregate 11; 12; 13; 14; 16; 17; 18 in the region of the input, e.g. a roller conveyor 103 can be provided (see e.g. Fig. 3). By means of this roller conveyor the drum 04.0; 04.1 delivered at the advanced position 23; 32 or a transport unit 27; 66; 67 comprising the drum 04.0; 04.1 or a drum 04.0; 04.1 available at a buffer position managed by the controller 98 of the aggregate 11; 12; 13; 14; 16; 17; 18, e.g. provided between the advanced position 23; 32 and contact position 31; 33, or a transport unit 27; 66; 67 comprising the drum 04.0; 04.1 is taken and - e.g. if the contact position 31; 33 is ready to receive - inserted in it. The conveyor device 103 is preferably controlled by or through the controller 98 assigned to the aggregate 11; 12; 13; 14; 16; 17; 18 and the relevant processing step P.x. For the case that the drums 04.j are fed on the above mentioned transport means 26; 108; 109, in

particular system transport means 108; 109, in addition preferably a conveyor device 104, e.g. roller conveyor 104, can be provided for removal of the completely or if applicable only partially emptied transport means 26; 108; 109. The conveyor device 104 or the inner transport path described by it up to an removal position 113 for the transport means 26; 108; 109 is preferably also controlled and managed by the controller 98 on the aggregate side.

In principle independently from, however preferably together with the above mentioned device 89 for interruption-free material supply and/or the device 91 for interruption-free material removal on the output side of one or more of the processing aggregates 11; 12; 13; 14; 16; 17; 18, in particular at least of the processing aggregate(s) 11; 12; 13; 14; 16; 17; 18 configured as a printing press(es) 11 and/or the processing aggregates 11; 12; 13; 14; 16; 17; 18 configured as the first mechanical processing aggregate(s) 13 (e.g. punching device(s) 13, a conveyor device 103, assigned to the processing aggregate 11; 12; 13; 14; 16; 17; 18 in the region of the output, e.g. a roller conveyor 103 can be provided (see e.g. Fig. 3). By means of this roller conveyor the drum 04.0; 04.1 delivered at the delivery position 111; 112 or a transport unit 27; 66; 67 comprising the drum 04.1; 04.2 is taken and - e.g. if the dispensing position 29; 41 is ready to receive - conveyed to the dispensing position 29; 41 or if necessary to a buffer position managed by the controller 98 of the aggregate 11; 12; 13; 14; 16; 17; 18, e.g. provided between the delivery position 111; 112 and dispensing position 29; 41. The conveyor device 106 is preferably controlled by or through the controller 98 assigned to the aggregate 11; 12; 13; 14; 16; 17; 18 and the relevant processing step P.x. For the case that the drums 04.j are delivered and removed on the

above mentioned transport means 26; 108; 109, in particular system transport means 108; 109, in addition preferably a conveyor device 107, e.g. roller conveyor 107, can be provided for feeding empty transport means 26; 108; 109 to the delivery position 111; 112. This conveyor device 107 or the inner transport path depicted by it from an advanced position 114 to the delivery position 111; 112 is preferably also controlled and managed by the controller 98 on the aggregate side.

The respective removal position 113 and an advanced position 114 for the empty transport means 26; 108; 109 can be connected to each other by means of an inner transport path managed and/or controlled by the aggregate 11; 12; 13; 14; 16; 17; 18, or if necessary by means of an outer transport path not managed and/or controlled by the aggregate 11; 12; 13; 14; 16; 17; 18. On said transport path for example empty transport means 108 can be brought to the output and/or drums 04.j can be brought from the output for another processing to the input of the aggregate 11; 12; 13; 14; 16; 17; 18. In addition or instead of this the removal position 113 for the empty transport means 26; 108; 109 can be connected to an aggregate 11; 12; 13; 118; 119 lying upstream in a material flow, e.g. a processing aggregate 11; 12; 13 arranged upstream or preferably a manipulation aggregate 118; 119 for supplying it with empty transport means 108; 109 by a transport path 116; 117. In one design to be preferred at least one transport path 116 is provided for the transport of empty system transport means 108; 109 from the removal position 113 of the first processing aggregate 11; 12; 13; 14; 16; 17; 18 in the production process configured with means for interruption-free material feed to an advanced position of a manipulation aggregate 118; 119 configured for relocation arranged upstream

of this processing aggregate 11; 12; 13; 14; 16; 17; 18. On this transport path 116, which is schematically indicated in Fig. 1 only for the top aggregate 11_k, preferably the above mentioned turning aggregate 137 and/or collecting and/or return station 136 is provided. In addition, preferably at least one transport 117 is provided for the transport of empty system transport means 108; 109 from a removal position 113 of a downstream processing aggregate 11; 12; 13; 14; 16; 17; 18 or the packing level K to an advanced position 114 on the output of an upstream processing aggregate 11; 12; 13; 14; 16; 17; 18.

In the region of the packing level K the products 03 can be brought in the product drums 08 on transport means 121, e.g. as outgoing goods pallets 121, which later at the outgoing goods 08 exit the plant 01 together with the product drums 08 as transport units 24. The transport means 121 provided for the outgoing goods 07 are for example subject to a standard and can be provided as an international standardized pallet 109 with respect to dimensions, e.g. standard pallet 109 for example as a so-called 'Europallet' or a so-called 'industrial pallet'. The designed standard transport means 109 can be used for the standard transport means 121.

Thus, for example in the plant 01 at least three pallet types can be handled, wherein for example format pallets 27 are to be extracted after unloading, at least one type of system pallet 108; 109 circulates in the plant 01 (at least between the incoming goods warehouse 01 and packing level K), and one standard pallet 121 exits the plant 01. In one preferred improvement two types of system pallets 108; 109 are provided, one for insertion of the incoming goods 06 or at least from the input of the warehouse 09 to a relocation prior to a

processing level P.x with interruption-free material feed, and a second system pallet 109, e.g. suitable for an interruption-free material feed for the or a part of the processing step 53 up to at least the input of a last processing step P.x with interruption-free material feed, at the latest for packing level K.

In order - e.g. in spite of decentralized and autonomous machines - to be able to do higher order scheduling of the production P of orders A(n) in the plant and efficiently implement it, a production and resource planning 139 of higher-level than the overall process is provided, in which among other things, on the one hand the accepted orders A(n) to be carried out are recorded and characterized ("Order description"), and on the other hand a scheduling for the dispatching of the processing steps P.x necessary for the pending orders A(n) at the available aggregates 11; 12; 13; 14; 16; 17; 18 ("Process and Resource Planning) is carried out.

While production and resource planning could be performed purely manually, it is preferably provided as a data-processing supported planning and/or control system 139, in which among other things the orders A(n) to be executed are created and characterized ("Order description") and in which on the other hand the utilization of the available resources, in particular of the processing aggregates 11; 12; 13; 14; 16; 17; 18 available in the plant 01 is planned and managed ("Resource Planning"). In principle this can be accomplished by any means, e.g. manually by creating corresponding lists and/or tables for example in a data processing device of the planning and/or control system 139, by means of input in fields of a menu-guided application program implemented in the

planning and control system 139, all the way to a partially automated planning/scheduling with the assistance of scheduling software implemented in the planning and/or control system 139.

The planning and/or control system 139 is configured as a data processing system with a data processing program implemented in a data processing device in one or more parts of one or more linked program modules with at least one operator interface, by means of which - for example in an order acceptance 143 (se e.g. Fig. 12) - new orders A(n) are for example created supported by software using an unambiguous designation an and, e.g. at least as far as the required processing steps P.x are concerned, are described or can be described, and/or by means of which - for example in the planning 144 by an operator (e.g. of a production management 153) - the and resource planning, e.g. at least as far as the on the available aggregates 11; 12; 13; 14; 16; 17; 18 is concerned, is performed or can be performed, preferably with the support of software. In addition, the planning- and/or control system 139 is preferably configured to provide information from the order description and data or results from the process and resource planning process and resource planning in a defined format assigned to it or with this associated memory structure as structured data D_A; D_R, in particular as far as the type (e.g. the physical characteristics and organization of the signal transmission) of the data transmission is concerned as well as with respect to the structuring and/or formulation of the contents (e.g. the description language).

In one especially preferred design of the plant 01 in addition to the production and resource planning 139 supported at least

by data processing technology production and resource planning 139 it comprises a system for controlling the material flow with a material flow controller 146, by means of which at least one transport process of material drums 04.j comprising one or more process steps P.6; P.9, P.12; P.13; P.14; P.19; P.21; P.22; P.23 P.26; P.30 is coordinated between one of the processing levels S.i and one of the subsequent processing levels S.i+1 for the product 03 to be manufactured. Advantageously by means of the material flow controller 146 the material flow between at least the output of the first of the processing levels S.1 and the input in a third or even the last of the at least two, e.g. at least three processing levels S.a, in particular however between a conditioning level arranged upstream of the first of the processing levels S.1 (e.g. a manipulation aggregate 118; 119) and at least the input in the last of the processing levels S.a or a packing level K or even a storage in a finished products warehouse 63, or in an incoming goods warehouse 09 and at least the input in the last of the processing levels S.a or a packing level K or even a storage in a finished products warehouse 63 or even between an incoming goods 06 and at least the input in the last of the processing levels S.a or a packing level K or even a storage in a finished products warehouse 63 is coordinated and/or controlled. The control by means of the material flow controller 146 is preferably to be understood in the sense of a specification of a transport order, i.e. a transport movement between a starting (start) and end position (destination); however not as a movement control itself.

Regardless of the above mentioned way of production via purely manual input all the way to partially automated generation hence there is information in the planning and/or control system 139 from the performed planning D_A about the planned

orders A(n), e.g. the respective order description with at least the unique designation a_n and the required work steps, and information D_R about process und resource planning, i.e. on dispatch of the work steps to the processing aggregates 11; 12; 13; 14; 16; 17; 18, which in structured and machine readable form - e.g. via a signal path or portable data storage media and if necessary via one or more correspondingly set up communication interfaces - can be transmitted to or is accessible from an addressee, in particular to at least the material flow controller 146 as an addressee, where said information can be read or evaluated using the format specifications available for data transmission and the description language. Such information D_A; D_R on the planned/scheduled orders A(n) and/or about the process und resource planning can also be transmitted and/or made available to one or more of the controllers 98 assigned to the aggregates 11; 12; 13; 14; 16; 17; 18; 118; 119 and/or groups of such aggregates 11; 12; 13; 14; 16; 17; 18; 118; 119 as addressees. The operating personnel can then “load” the information provided from the production und resource planning 139, i.e. data for processing the relevant processing step P.x for the specific order A(n).

The information D_A; D_R is preferably created in the form of structured data D_A; D_R and e.g. on the one hand as order data D_A showing the order description and on the other hand as work plan data DR of the respective plan data D_A; D_R for the upcoming production process P or the pending production processes P. Order data DA and work plan data DR can in principle be provided jointly in one information packet or also as information packets separate from one another, which e.g. however at least are assigned or can be assigned to one another via the unique designations a_n of the orders A(n).

In principle the structured data D_A; D_R can be transmitted in any form defined as signals or signal sequences showing information or information packets by means of for example correspondingly configured hard wired or wireless signal connections 138; 181, e.g. signal lines. However, preferably a network connection 138; 181 of a network of basically any topology, e.g. a bus connection 138; 181 is provided between the planning and/or control system 139 and the addressee or user of the above mentioned data D_A; D_R., e.g. of the material flow controller 146 and/or the control units 98, by means of which the data transmission, in particular a data exchange, occurs defined by the protocol underlying the network. If necessary the underlying network can be designed heterogeneously, wherein for this case corresponding interfaces and/or couplers are present.
The data D_A; D_R itself can be provided and transmitted in basically any structure. Thus in a simple design it can be provided and transmitted in the form of a ribbon-type or tubular information sequence (e.g. a sequence of characters and/or character strings), which the agreed signal pattern and the description language are based on).

However, in a preferred design the data D_A; D_R can be provided and/or transmitted as contents of one or more files 141; 142 or as media comprising access 142; 141 to the data. This information D_A; D_R can be transmitted and/or exchanged as a file 141; 142 in known manner via the corresponding signal connection 138 between the planning- and/or control system 139 and the addressee or user 146; 98. Providing and transmitting the data D_A; D_R should be understood here along with the transmission of a file 141; 142 containing this data D_A; D_R in equal measure as the provision of such a file 141; 142 by the

planning and/or control system 139 to a file server and an access 142; 141 to such data D_A; D_R by the "addressee" to be generalized as "user" of this D_A; D_R.

In an advantageous design the file 141; 142 is configured in the form of an open file format, in particular of an open text format. Preferably the file 141; 142 is a text file 141; 142 composed in the markup language XML or a text file arising from this by expansion or improvement of this markup language, e.g. as a so-called XML document 141; 142.

The mentioned and maintained plan data D_A; D_R can - e.g. as long as the steps and/or substeps have not yet begun - be modified by the production planning 144.

In the preferred design of the plant 01 as a packaging resin- and/or printing materials processing and/or a packaging and/or print products production plant 01 the planning and/or control system 139 can preferably provide and/or transmit or make accessible to the user a file 141; 142 comprising order data D_A and/or work plan data D_R in the so-called job definition format (JDF format, e.g. at least in version 1.4 and above). The JDF format is an open file format that provides a standardized language for describing processes in the graphic and printing industry and is based on the XML markup language. The specification of the format is created and is being updated by the consortium of CIP4. International Cooperation for the Integration of Processes in Prepress, Press and Postpress (CIP4).

A corresponding standard can be agreed upon in individual cases or as in the above mentioned case already exist and be

used for production plants 01 for multiple, in particular multiple level processing from other industrial sectors.

The minimum requirements for the information and/or values to be provided and if necessary their exact syntax and/or semantics for the plan data D_A; D_R to be provided for the planning and/or control system 139 are to be defined in a so-called interface description. In particular, for example defined by the interface description - at least the unique designation a_n of the order A(n) and the processing steps P.x planned for the order are provided as information to be furnished in the order data D_A. Preferably information about the material to be processed and/or the material units 02.0 to be processed, and for example additional information about the customer can also be provided. For example, the sequence of the dispatch of processing steps P.x of different orders A(n) to processing aggregates 11; 12; 13; 14; 16; 17; 18 with reference to the specific order, e.g. the designation a_n, is provided as information to be furnished. Preferably information about the availability of individual aggregates 11; 12; 13; 14; 16; 17; 18 and if necessary additional specific information about the aggregates 11; 12; 13; 14; 16; 17; 18 can also be provided.

The planning and/or control system 139 is hence arranged so that orders A(n) can be created and described with respect to the necessary processing steps P.x in and/or by means of the planning and/or control system 139 as well as being able to create a plan for the dispatch of the processing steps P.x necessary for this purpose. In the process, the planning and/or control system should be configured to provide machine readable information D_A on the order A(n) preferably in the form of structured data D_A, e.g. as order data D_A depicting the

order description. This providing can occur for example in a so-called JDF job ticket, a kind of electronic "job folder". In particular, it should also be configured to give the production planner the opportunity to distribute the pending orders A(n) to the available resources, i.e. the aggregates, and to provide this information D_R on the work plan preferably in the form of structured data D_R, e.g. as work plan data D_A depicting the process und resource planning. The provision of the order data D_A and/or of the work plan data D_R can in each case occur by the transmission or a retrieval (e.g. from a file server) of the corresponding files 141 (142) or by access 142 (141) to the relevant data D_A; D_R in data records of a data source 166 configured as a file 166 or preferably as a database 166. In one design presented by way of example the provision of the order data D_A occurs for a user or addressee 146; 98, in particular to the material flow controller 146, via an above mentioned file 141 and the provision of the work plan data D_R takes place by access 142 of the material flow controller 146 via a corresponding database interface to the data of a database 166 containing the work plan data D_R, e.g. integrated in the planning and/or control system 139. However, both ways, thus by a file 141 (142) or by an access 142 (141) to the stored data, constitute a provision of data D_A; D_R for the material flow controller 146 from the higher level planning and/or control system 139.

In an advantageous design presented here the planning and/or control system 139 comprises a so-called enterprise resource planning system, ERP for short, which makes possible the description of the provided processing steps P.x for a planned order A(n) and if necessary a respective updating of a current status of the order (n) after each occurred processing step P.x. The ERP can in this case supply information about which

processing step P.x is pending as next and makes it possible to get information about the status of the entered orders A(n). In addition, the individual production runs on the available processing aggregates 11; 12; 13; 14; 16; 17; 18 (resources) can be planned in the ERP system and, on the basis of the feedback from these aggregates 11; 12; 13; 14; 16; 17; 18 the program can indicate whether the processing is occurring according to plan or with deviations. From the planning and/or control system 139, in particular of the ERP system, a reporting system reporting to the management 154 can also be possible or provided (see e.g. Fig. 12). In this connection for example data about the current existing orders can be accessed in an order backlog 156 and/or overviews on operational data and/or consumption materials can be viewed in corresponding compilations and for example a production plan 157 containing the work plan data D_R. From the planning and/or control system 139, in particular of the ERP system, process values 161 such as e.g. default values 161 about a corresponding signal path can also be transmitted to the processing aggregates 11; 12; 13; 14; 16; 17; 18. Also the above mentioned order data D_A and/or work plan data D_R can be transmitted to the processing aggregates 11; 12; 13; 14; 16; 17; 18 over corresponding signal paths. Conversely process data 162 can be returned as feedback from one or more processing aggregates 11; 12; 13; 14; 16; 17; 18 to the planning and/or control system 139, in particular to the ERP system, over corresponding signal paths. In the above mentioned advantageous design of the plant 01 for manufacturing packaging and/or printed products the feedback can occur in JMF format (job message format), which constitutes a format for feedback and tracking compatible to the above mentioned JDF format.

Planned by and/or monitored by the higher level planning and/or control system 139 the production and process control for manufacturing the specific product 03 now occurs along a corresponding process chain 147 with the process steps P.x; P.y (see e.g. Fig. 11) necessary for manufacturing the product. Parallel to this a plurality of manipulation steps P.y, in particular a plurality of transports P.6; P.9, P.12; P.13; P.14; P.19; P.21; P.22; P.23 P.26; P.30 between e.g. incoming goods 06, storage 09; 37; 57; 63 and aggregates 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 and/or a plurality of storage or retrievals P.7; P.8; P.27; P.28 and/or of intermediate storages P.15; P20 are necessary, which e.g. in Fig. 11 are indicated as a the whole by the summary in a process chain 148 standing for the logistics. In the process chain 148 relating to material logistics for example the storage, retrieval and/or relocation processes run parallel in a process section 149 relating to the incoming goods warehouse and the outgoing goods warehouse 09; 63 and the above mentioned transports P.6; P.9, P.12; P.13; P.14; P.19; P.21; P.22; P.23 P.26; P.30 run parallel in a process section 151 relating to the respective transport process of the drums 04.j interacting with the processing and manipulation steps P.1; P.1'; P.2; P.3; P.4; (P.4') P.5; P.11; P.11; P.24; P.25 from the process chain 147.

As already indicated/implied above, transport processes of material drums 04.j between at least one of the processing levels S.i and one of the subsequent processing levels for the product 03 to be manufactured are coordinated and/or controlled by the material flow controller 146. The incorporation of transport processes between aggregates 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 of the plant 01 in the material flow controller 146 is in principle scalable up to

the inclusion of all transport routes 22; 28; 34; 39; 54; 61; 64; 116; 117 and if necessary existing partial routes referring to them, so that the following designs - if not explicitly formulated in deviation to this - in general relate to the transport routes 22; 28; 34; 39; 54; 61; 64; 116; 117 incorporated in the material flow controller 146 and the aggregates 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 affected by them in the corresponding stage of development.

A part of the plant integrated in the material flow controller comprises for example at least one or more printing presses 11 and at least one or more processing aggregates 11; 12; 13; 14; 16; 17; 18 of at least one further type, e.g. one or more punching devices. A part of the plant integrated in the material flow controller 146 comprises e.g. the transport path arranged upstream on the input side of the printing press 11 and arranged downstream on the output side to a further aggregate downstream and/or to a buffer warehouse. However, one or more further aggregates 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 as well as one or more transport routes 22; 28; 34; 39; 54; 61; 64; 116; 117 - e.g. corresponding to the described stages of development - can also be incorporated.

Hence, within the production plant 01 configured for multiple and/or multiple-level production the material flow controller 146 - if e.g. correspondingly activated - assumes the coordination and/or control of the required transports P.6; P.9, P.12; P.13; P.14; P.19; P.21; P.22; P.23; P.26; P. 30 and, if integrated, processes of storage and/or retrieval for the incorporated transport routes 22; 28; 34; 39; 54; 61; 64; 116; 117.

In this connection, by coordination and control of the transport processes by the material flow controller 146, at least the higher level control, thus the inducement of the transport movements and if necessary their logging and/or monitoring are to be understood. The concrete movement control of the transport means 65; 68; 69; 74; 78; 79 addressed by the material flow controller 146 or the group or chain of transport means 65; 68; 69; 79 corresponding to the transport order T_M occurs by means of the respective control means of a transport means controller whose control circuits configured e.g. as control switches or as control programs can all or sometimes if necessary part of the central material flow controller 146 or can also be provided locally.

In the design of transport means 60; 65; 68; 79 configured as driverless transport vehicles 65; 68; 79 they can be designed completely or partially as transport vehicles 60; 65; 68; 79 mechanically conducted on a respective transport route, in particular rail-bound transport vehicles of a transport system based on mechanical guidance or can be designed completely or partially as contactless, i.e. without mechanical guidance, transport vehicles 60; 65; 68; 79 guided along a transport route of a correspondingly set up system (FTS). In both cases the transport order T_M is directed from the material flow contro0ller 146 to the transport means controller responsible for the movement control of the transport means 60; 65; 68; 79. A driverless transport vehicle 65; 68; 79 is in the process connected by means of electrical signals via the transport means controller to a material flow controller 146, wherein the latter is preferably in signal connection indirectly via the transport means controller with at least one further transport means 65; 68; 79 that can be operated

mechanically independently from the first mentioned transport means 65; 68; 69; 74; 79.

For the case of transport means 65; 68; 79 configured as contactless guided driverless transport vehicles 65; 68; 79 the control means, i.e. the transport means controller comprise e.g. a higher level control unit receiving the transport orders T_M, e.g. a vehicle master controller, and in each case the control units assigned to the transport means 65; 68; 79, e.g. vehicle computer, which implements the commands relevant to the entire transport process or subprocesses received from the higher level control unit. The transport order T_M is then e.g. directed to the higher level control unit, which if necessary selects the transport vehicle 65;68; 79 and outputs the transport order T_M - prepared in total or preferably successively in partial routes - to the control unit of the relevant transport vehicle.

The transport order T_M directed to the transport controller of a chain or group of transport means 65; 68; 79 comprises for example at least the pickup position and the delivery position for the drum 04.j to be transported, which in each case represents a position unique defined in the plant 01, e.g. from positions 21; 23; 24; 29; 31; 32; 33; 36; 41; 56; 62; 71; 111; 112. For the case of transport means 65; 68; 79 configured as driverless transport vehicles 65; 68; 79 the transmission of the transport order TM from the material flow controller 146 to the vehicle controller occurs preferably over a cable-less signal connection.

The coordination and/or control of the transport process within the production plant 01 configured for multiple and/or multiple-level production by the material flow controller 146

- for example for products 03 differing from one another with different manufacturing depth - happens on the basis of information from the above mentioned order data D_A, e.g. the listing of the production steps P.x required for the product 03 to be manufactured or the specific order (A(n), and/or on the basis of information from the above mentioned work plan data D_R, e.g. from dispatch or machine utilizations plans stored there (i.e. of a listing about which product should be processed or conditioned when on which production resource, e.g. which aggregate 11; 12; 13; 14; 16; 17; 18; 19; 118; 119), and/or on the basis of the current status of the drum 04.j to be processed for the specific product 03 and/or on the basis of information about the available resources, i.e. the available aggregates 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 and/or transport means 68; 69; 74; 78; 79 and/or warehouse and/or buffer positions 24; 36; 42; 56; 62; 71, and/or on the basis of the expertise stored as rules and/or boundary conditions R for the material flow.

To this end, the material flow controller 146 is for example designed as a data processing means implemented in a data processing device, e.g. a data processing program, with correspondingly configured evaluation and computation algorithms or as a data processing device, which is set up for the above mentioned coordination and/or control of the transport process or for the above mentioned generation of the transport orders with corresponding data processing means.

The material flow controller 146 obtains the information required for the coordination and/or control from the order data D_A and/or work plan data D_R as information D_A; D_R in one of the ways mentioned above over a signal path or portable data storage media, for example by transmitting at least one

and/or access to at least one above mentioned file 141 (142) containing the information D_A; D_R and/or database access 142 (141). For example, the material flow controller 146 obtains over the signal connection 138, e.g. a network connection 138, at least the information about the order data D_A via a text file 141; 142, in particular an above mentioned XML document 141; 142, from the planning and/or control system 139 or the Order backlog 156 present there if necessary. It can also obtain the information about the work plan data D_R from a text file 142, in particular an above mentioned XML document 142, or preferably through an access 142 to an above mentioned database 166, in particular e.g. the data of a production plan 157 (see e.g. Fig. 12, Fig. 20). This access 142 can occur either via the same or a comparable signal connection 138 to the planning and/or control system 139 or via a different signal connection 179.

In one advantageous design of the plant 01 or of the production process P the material flow controller 146 is e.g. comprised as a module 146 of a material logistics system 158 in which a warehouse management system 152 in direct or indirect signal connection with the material logistics system 158 is also provided for the management of the incoming goods warehouse and/or outgoing goods warehouse 09; 63. The warehouse management system 152 takes over at least the inventory management of the raw material drums 04.0 available in the warehouse 09 or of the transport units 21; 66 comprising the raw material drums 04.0 and/or the inventory management of the product drums 08 stored in the warehouse 63 or of the product drums 08 in or on transport units 124 comprising transport means 121. In this design the inventory 159 of the incoming goods warehouse and/or of the outgoing goods warehouse 09; 63 is conducted by the material logistics

system 158 and is for example accessible to an access by the planning and/or control system 139 (see e.g. Fig. 12). The warehouse management system 152 "knows" about the inventory and the storage facility and gives the transport orders necessary for a storage or retrieval within the warehouse 09; 63 to the connected transport means 74; 78. In an alternative design the warehouse management system 152 can also be comprised as a module of the material flow controller 146.

As already stated above, the transfer of the relevant information D_A to the planned orders A(n) and of the relevant information D_R on the process and resource planning to the material flow controller 146 is realized for example in each case via one or more files 141; 142 and/or for example via a respective access to the data of a data base 166 provided in the planning and/or control system 139 or for example in mixed form, as far for example as the information D_A about the planned orders A(n) via a file 141 (see e.g. Fig. 12, Fig. 13 and Fig. 14) and with respect to the information D_R about the process and resource planning for example via a database access (see e.g. Fig. 12, Fig. 13 and Fig. 15). The transfer of the data in file form occurs e.g. via an interface 163, e.g. an XML interface 163. The access to the database 166 occurs by way of example along e.g. the differing signal connection 179 via an interface 164 configured as a database interface 164, in particular an ODBC interface (see e.g. Fig. 13). The control devices 98 of processing aggregates 11; 12; 13; 14; 16; 17; 18; 19 can likewise obtain information DA; DR on the orders A(n) and/or on the process and resource planning via one or more of the mentioned interfaces 163; 164.

No later than the entry of a drum 04.j into the part of the plant 01 incorporated in the material flow controller 139

and/or coordinated by said material flow controller with respect to the material flow does a drum 04.j (if necessary via the "circuitous route" of a transport means 26; 108; 108 explicitly assigned to it and/or of a transport unit 27; 66; 67 clearly assigned to it) by assignment of a unique designation $\{04.j\}_m$, which ,if necessary can be a unique description or preferably an identifier as e.g. a so-called drum ID $\{04.j\}_m$, undergo an individualization. This individual drum $04.j_m$ is saved under its unique description and/or designation $\{04.j\}_m$, preferably together with article data article data $D_{Art}(m)$ relating to the drum $04.j_m$, recorded and saved in structured manner in a data structure 169 of a data processing-based material management 168, e.g. a database-based material management system 168(see Fig. 16). This can occur as an entry of data $d_{Art}(m)$ in a data structure 169, e.g. of a data record $d_G(m)$ comprising drum data in a file 169 kept in the material management 168 or a file system 169 or preferably by generating and filling a data record $d_G(m)$ relating to the specific drum $04.j_m$ in a database 169 implemented in the material management 168.

At least information about the material, for example an identifier identifying the material units $02.j_m$ and/or information about the type and/or state and/or format of the material units $02.j_m$ and/or information about the number z of the material units $02.j_m$ contained in the drum $04.j_m$ can be comprised as article data $D_{Art}(m)$ characterizing the drum $04.j_m$ and/or as drum data incorporated in the data record $d_{Art}(m)$ of the data structure 169. In the case of an identifier article data $D_{Art}(m)$ characterizing the drum $04.j_m$ if necessary also data from a previous material order can be imported. If the drum $04.j_m$ is recorded as part of a transport unit 27; 66; 67 with a transport means 26; 108; 108 and/or together with

further drums 04.j, information p about the transport means 26; 108; 108 can also be saved, e.g. about the type of transport means 26; 108; 108 and/or a unique identifier of the individual transport means 26; 108; 108 and/or about the relative location of further drums 04.j received by the transport means 26; 108; 108. The recording itself can occur by means of correspondingly installed acquisition means 167 connected by means of electrical signals to the material management 168. The acquisition means 167 can be designed as an operator interface 167 for inputting corresponding data and/or for selection of a data record $d_G(m)$ for example generated from the preceding material order and/or as a read device 167 interacting with a coding supplied by the drum $04.j_m$, e.g. a bar or 2D code, e.g. a scanner 167, or alternatively a combination of what has been mentioned above. The recording can occur for example directly at the incoming goods 06 or e.g. at the latest in the incoming goods warehouse 09.

For each drum $04.j_m$ individualized by a unique designation $\{04.j\}_m$ in the material management 168 preferably its tracking also occurs in the plant 01. To this end, in the material tracking 168, in particular in the corresponding data record $d_G(m)$, a specification, e.g. a link/reference, to the current location is included for the respective drum $04.j_m$. Preferably these are predefined positions in the plant, which e.g. are constituted by the above mentioned entry position 21, warehouse positions 36; 56; 62; 71, advanced positions 23; 32; 31; 33, delivery positions 111; 112, dispensing positions 29; 41 and/or buffer positions 24; 36; 56. The constantly changing positions during a transport on the relevant route are for example not carried along, but rather e.g. only characterized by a status relating to the current transport. The material

management 168 can be comprised as an independent system, only connected to the material flow controller 146 and/or if necessary directly and/or indirectly connected to the warehouse management system 152, for example as application software on a separate or a data processing means of the material flow system 1 146 or of the warehouse management system 152, as a module, e.g. a program module, from the material flow controller 146, or for the case of an integrated and/or cooperating/interacting warehouse management system 152, comprised by it, e.g. a correspondingly designed application software program.

No later than the entry of a drum 04.j_m into the first of the processing aggregates 11; 12; 13; 14; 16; 17; 18;19 incorporated in the material flow controller does a drum 04.j (if necessary via the "circuitous route" of a transport means 26; 108; 108 explicitly assigned to it and/or of a transport unit 27; 66; 67 clearly assigned to it) - both factually and nominally - receive an allocation to a specific order A(n) (e.g. Fig. 16, Fig. 18). The nominal allocation can also be performed and/or occur directly in the above mentioned recording of the drum 04.j_m for the material management 168 or for example on retrieval from the incoming goods warehouse 09 for use in the relevant pending order A(n). The allocation to the order A(n) is preferably available - for example by entry in the line relating to the drum 04.j_m or the data record - in the material management 168 relating to the drum 04.j_m, in particular in the line relating to the drum 04.j_m or the data record relating to the drum 04.j_m. The allocation can occur manually via an operator interface for inputting corresponding data and/or for selecting an order A(n) for example generated from the preceding material order or automatically by allocation of a recorded drum 04.jm to the order A(n)

underlying an order specific order. For the case that the allocation does not occur until retrieval or until the entry into the first of the processing aggregates 11; 12; 13; 14; 16; 17; 18; 19 incorporated in the material flow controller 139, the allocation to the relevant order A(n) and the entry occur by the material flow controller 139 itself on the basis of the plan data D_A; D_R there. If a specific order A(n) is formed by material units $02.j_m$ of several drums $04.j_m$, in addition to the allocation to the order (n) a drum number g relating to the same order can also be allocated (e.g. Fig. 16).

A system for tracking and or controlling the material flow comprised by the material flow controller 146 or connected to it by means of electrical signals and cooperating with it comprises a memory structure 169, e.g. the above mentioned or a correspondingly configured file 169 or database 169, with defined memory locations, at which drum-specific data records $d_G(m)$ with drum-specific information $d_G(m)$, comprising at least currently assigned unique designation $\{04.j\}_m$, a specification clearly establishing the reference to a specific order A(n) and a specification representing the current product status {P.x} of the material units $02.j_m$ of the drum $04.j_m$ managed under the designation $\{04.j\}_m$ as well as if necessary a specification relating to the number z of the material units $02.j_m$, are saved or can be saved. In addition, information about the drum number g and/or information p about a transport means p currently bearing the drum $04.j_m$ and/or a specification about the last change to the information relating to the information $D_G(m)$ is also saved or can be saved.

The entirety of the information summarized here as drum-specific information $D_G(m)$ can in principle only constitute an overlap with the information relating to the specific drum $04.j_m$ contained in the relevant data record $d_G(m)$, however corresponds advantageously to the entirety or preferably a subset of the information contained in the corresponding and/or relevant data record $d_G(m)$ of the data structure 169. This information $D_G(m)$ can also be referred to in the following as a record $D_G(m)$ of drum-specific information. For example, detailed information about material and/or suppliers.

In addition the system for material flow control and/or the system for tracking and/or controlling the material flow comprises a data processing means 173; 174, for example a program routine 173; 174, which is in logical signal connection to at least one signal transmitter supplying information-containing signals or signal sequences I.g of at least one controller 98 (99; 101; 102) of at least one of the processing aggregates 11; 12; 13; 14; 16; 17; 18, in particular of at least one printing press 11 and a subsequent processing aggregate 11; 12; 13; 14; 16; 17; 18, e.g. configured as a punching device 13, preferably all processing aggregates 11; 12; 13; 14; 16; 17; 18 or groups of processing aggregates 11; 12; 13; 14; 16; 17; 18 incorporated in the material flow controller 146 and/or connected to the system for tracking and/or controlling the material flow and to the memory structure 169 managing the information $D_G(m)$ in corresponding data records $d_G(m)$. The data processing means 173; 174 and the logical signal connection to the at least one signal transmitter supplying information-containing signals or signal sequences I.g of the controller 98 (99; 101; 102) and to the software managing the data records $d_G(m)$ and/or information $D_G(m)$ in the memory structure 169 are configured

such that, as a result of an information-containing signal or signal sequences I.g generated in the controller 98, the relevant data record $d_G(m)$ and/or the drum-specific information $D_G(m)$ within the sense of the information transmitted by the signal and/or signal sequence I.g can be changed or is changed or under consideration of the information transmitted by the signal and/or signal sequence I.g is transferred to a new data record $d_G(m')$ and/or to a new drum-specific information $D_G(m)$ with for example a new unique designation $\{04.j\}_{m'}$ (see e.g. Fig. 17).

The signal transmitter assigned to the controller 98 (99; 101; 102) and/or the aggregate 11; 12; 13; 14; 16; 17; 18 can in principle be sensors relating to the information, wherein the signal or the signal sequence is constituted by the state at the output, a switching means relating to the information that can be actuated by operating personnel, wherein the signal or the signal sequence is constituted by the state at the output of the switching means, a command input at a corresponding operator interface relating to the information, or also an evaluation and computation algorithm integrated in or connected to the controller, whose result returns the information-containing signal or signal sequence. Specifically, this can for example be sensors checking for the presence of a drum 04.j or a transport unit, a required acknowledgment by the personnel or in formation relating to the production run from the controller of the relevant aggregate 11; 12; 13; 14; 16; 17; 18. Such a signal transmitter - in particular at least logically - is only allocated to this aggregate 11; 12; 13 and/or the relevant controller 98 on site.

A signal or signal sequence relating to information-containing information is a signal or a sequence of signals which supply unambiguous and with respect to the addressed meaning, complete information on the basis of the unique origin and/or definition of its meaning.

Information transmitted by the signal or signal sequence I.g can for example relate to a change in the product status {P.x} of the material units 02.j_m of the drum 04.j_m at least up to that point managed under the designation {04.j}$_m$ and in a first design update a change of the existing data record $d_G(m)$ and/or of the drum-specific information $D_G(m)$ with regard to the specification representing the status change or alternatively in another design to be preferred the creation of a new data record $d_G(m')$ or of new drum-specific information $D_G(m')$ including the current product status (P.x') and preferably transferring other, unchanged information from the previous data record $d_G(m)$ or the previous information $D_G(m)$ to the new drum data record $d_G(m')$ or the new drum-specific information $D_G(m')$.

In principle, any specification describing the processing status can serve as a specification relating to the product status {P.x}, provided it is clearly correlated with the respective specification in the order data D_A showing the order description. In the variant presented here the last running processing step P.x is incorporated in place of the product status. For example, this can be “Printing” in clear text or for the case of a multiple printing or printing on both sides “1. Printing”, “Punching” etc.

In addition to or instead of that, information transmitted by a signal or a signal sequence I.g can relate to a number z of

the material units $02.j_m$; $02.j_{m'}$ in the current or updated product status {P.x} of the drum $04.j_m$; $04.j_{m'}$ at least up to that point managed under the designation $\{04.j\}_m$ or newly under the designation $\{04.j\}_{m'}$ and in a first design update a change of the existing data record $d_G(m)$ and/or of the drum-specific information $D_G(m)$ with regard to the specification representing the number z or alternatively in another design to be preferred the creation of a new data record $d_G(m')$ or of new information $D_G(m')$ including the current number z' and if necessary of the current product status (P.x') associated with this and preferably transferring other, unchanged information from the previous data record $d_G(m)$ or the previous information $D_G(m)$ to the new data record $d_G(m')$ or the new information $D_G(m')$. The change of the number z is in particular important for processing operations in which for example unloaded scrap (e.g. printer's waste) comes into being and/or in which the drum size changes according to plan.

In addition to or instead of that, information transmitted by a signal or a signal sequence I.g can relate to a specification on the position 21; 23; 24; 29; 31; 32; 33; 36; 41; 56; 62; 71; 111; 112 of the drum $04.j_m$; $04.j_{m'}$ at least up to that point managed under the designation $\{04.j\}_m$ or newly under the designation $\{04.j\}_{m'}$ and in a first, preferred design for the case of a position change update a change of the existing data record $d_G(m)$ and/or of the drum-specific information $D_G(m)$ with regard to the position or alternatively if necessary in an alternative design the creation of a new data record $d_G(m')$ or of new information $D_G(m')$ including the current position and transferring other, unchanged information from the previous data record $d_G(m)$ or the previous information $D_G(m)$ to the new data record $d_G(m')$ or the new information $D_G(m')$.

In addition, with each change, e.g. with each change of the data record $d_G(m)$ and/or of the drum-specific information $D_G(m)$ or with each new creation of a data record $d_G(m')$ and/or of the drum-specific information $D_G(m')$ a specification t for the date and/or time, e.g. a time stamp t, of the last change or new creation can be included. This can be of great advantage, for example if idle periods due to production or circumstances restricting storage life exist. Such conditions can also be maintained as so-called expertise in the form of rules and/or boundary conditions R in the material flow system 146 or a memory and/or computing means.

In the design with updating of the data record $d_G(m)$ and/or of the drum-specific information $D_G(m)$ in the case of a change of the product status {P.x} e.g. displaying the processing status and/or in the case of a changing number z the correspondingly changed drum $04.j_m$ is carried forward under the same designation $\{04.j\}_m$, which can be possible for less complex plants 01 and/or productions P and if necessary can be advantageous with respect to a simple tracking and allocation of individual drums $04.j_m$ physically present. With regard to complex plants 01 configured for multiple and/or multiple level production and/or more complex production processes P, in which for example drums 04.j are also supposed to be able to be split up or combined, the design with new creation is of special advantage, where, with each processing step P.x incorporated in the system for tracking and/or controlling the material flow and/or the material flow controller 169 a new imaginary drum $04.j_m$; $04.j_{m'}$ is generated by the creation of a new data record $d_G(m')$, e.g. drum data record $d_G(m')$, and/or by the creation of new drum-specific information $D_G(m')$, e.g. drum information $D_G(m')$, with a new, unique drum designation

$\{04.j\}_m$. This also applies then for the case that only the product status {P.x} and if necessary the included time stamp t change. In this design the system scalable without great difficulties to larger plants 01 and/or can be transferred to a variety of applications.

The signals or signal sequences I.g provided by the signal transmitter of the relevant aggregate 11; 12; 13; 14; 16; 17; 18; can in the process be processed either as simple I/O signals I, preferably however to structured data I.g of a defined format, in particular both with regard to the type (e.g. the physical characteristics and organization of the signal transmission) of the data transmission as well as with regard to the structuring and/or formulation of the contents (e.g. the description language), over a corresponding signal connection 179 supporting the format, e.g. a network connection 179 of a network of in principle any topology, e.g. a bus connection, supplied to the data processing means 173; 174 and evaluated and processed further by it, and finally cause a corresponding change and/or new creation of the data record $d_G(m)$; $d_G(m')$ in the data structure 169 by access 172, e.g. at least write access 172 and/or a corresponding change of the drum information DG(m); DG(m') included in a drum-specific file 171 and/or a new change of a corresponding drum-specific file 171'.

In the simplest design the information can be transmitted as a simple I/O signal, which for example as an output signal of sensors detecting a drum 04.j in the input or output region at a defined position, e.g. of a sensor 177; 178, - is supplied directly or via the controller 98 - to the data processing means 173; 174 and evaluated and processed further by it. From such a signal I.g then for example information of specified

content can derived, for example, that the drum 04.j+1, which was produced from the drum 04.j previously delivered to the relevant aggregate 11; 12; 13; 14; 16; 17; 18 after processing, must now have the product status {P.y+1}.

In another design the information represented by the signals or signal sequences I.g are provide in a ribbon-type or tubular information sequence (e.g. a sequence of characters and/or character strings), which the agreed signal pattern and the description are based on and transmitted to the data processing means 173, which for its part in a corresponding access 172 to the data of the data record $d_G(m)$ causes the above mentioned change or changed new creation of the data record $d_G(m)$; $d_G(m')$ on the basis of the information transmitted by the signal or the signal sequence I.g. The data processing means 173 can for example be provide as part of a management software allocated to the data structure 169.

In preferred design - in particular at least for information about the product status {P.x} and/or about the order (A(n) and/or about the number z - however there is no direct signal transmission of the individual information-containing signals or signal sequences I.g from the signal transmitter by the data processing means 173; 174 to the material management 168, but rather a transmission of one of several specifications, e.g. at least the designation, a specification about the order and a specification about the product status, comprising drum information $D_G(m)$; $D_G(m')$ in the form of a file. The system comprises in the process data processing means, by means of which a file 171 comprising the drum information $D_G(m)$; $D_G(m')$ of the relevant format using the data processing means 174 can be changed in its content and/or if necessary, transferring data from an existing file 171, can be regenerated. Such data

processing means can preferably in each case be provided on site in the respective controller 98 of the incorporated aggregates or alternatively - e.g. for the case that no suitable data processing device is provided on site - is included centrally by the material management 168 and/or by the material flow controller 164. In the second case, aggregates designed without their own "intelligence" can also be incorporated, wherein on site only a signal transmitter providing information-containing signals or signal sequences, for example the above named sensors 177; 178 and/or simple meaningful switching means and/or command inputs must be provided. In a system mixed in this regard combinations of these can also be provided, wherein for one or more, e.g. aggregates 11; 12; 13; 14; 16; 17; 18 having their own intelligence the file 171 can be changed or generated and transmitted on site, and for one or more, e.g. aggregates 11; 12; 13; 14; 16; 17; 18 designed without their own intelligence the change or generation of the file 171; 171' occurs centrally, thus an aggregate side generation is emulated. As an alternative to this in a system mixed in this regard for aggregates 11; 12; 13; 14; 16; 17; 18, by means of which no such file 171 can be generated or is generated on site, a direct access 171 can be provided in the above described manner by a correspondingly configured data processing means 173.

In a design comprising the changing and/or generation of files 171; 171' at a defined memory location, for example in a filing structure of a file server, the files 171; 171' themselves can configure the data structure 169 as a file system 169, whose contents other systems access or can access from the material flow controller 164 and/or the material management 168 and/or the material logistics system 158.

In the case of the files 171; 171' and their transfer it is primarily a matter of a defined and structured medium, by means of which the drum information $D_G(m)$; $D_G(m')$ can be transmitted in a defined, and preferably standardized format between individual components of the system, for example between the controllers 98 of the incorporated aggregates 11; 12; 13; 14; 16; 17; 18 and the system components consuming this data, e.g. the material flow controller 164 and/or the material management 168 and/or the material logistics system 158.

In an advantageous design such files 171; 171' are exchanged in both directions, i.e. both from aggregates 11; 12; 13; 14; 16; 17; 18 to the material management 168 and from said material management to the aggregate 11; 12; 13; 14; 16; 17; 18 (see e.g. Fig. 19). A controller 98 allocated to the respective aggregate 11; 12; 13; 14; 16; 17; 18, in particular a printing press 11 or punching device 13 is in particular to be understood as a control device or control environment by means of which the relevant aggregate 11; 12; 13; 14; 16; 17; 18 in principle can also be controlled autonomously from the rest of the plant 01.

For example an existing file stored centrally in the material management 168 or in the system and containing the current data $D_G(m)$ or a file 171 obtained from the current data $D_G(m)$ in the material management 168 can be transmitted to an aggregate 11; 12; 13; 14; 16; 17; 18 or its controller 98, where it can be changed or updated or recreated by the data processing means provided there - e.g. using the data processing means 134 corresponding to the information represented by the signals or signal sequences I.g. In the

process e.g. simultaneously a new unique designation $\{04.j\}_m$ is assigned for the newly formed stack 04.j.

In the preferred design, however in the case of the files 171; 171 and their relevant memory location for their intermediate storage it is not a matter of the actual data structure, but rather only the data transfer via the defined and structured medium of these files 171; 171;. After the reading of the data, they are processed and stored as changed or new data records $d_G(m)$; $d_G(m')$ corresponding to the transmitted information $D_G(m)$; $D_G(m')$ in the data structure 169 preferably designed as a database 169.

In principle the structured data $D_G(m)$; $D_G(m')$ can be or are transferred in any form as defined signals or signal sequences depicting information or information packets via for example correspondingly configured, hard-wired or wireless signal connections 182, e.g. signal lines. Preferably however, a network connection 182 of a network in principle of any topology, e.g. a bus connection 182, is provided for data transfer between the material flow controller 146 and the addressee or user of the above mentioned data $D_G(m)$; $D_G(m')$, e.g. the control units, via which the data transfer, in particular a data exchange, occurs defined via the protocol underlying the network. If necessary the underlying network can be designed heterogeneously, wherein for this case corresponding interfaces and or couplers are present.

For the drum-specific data DG(m); DG(m') to be transferred from the controllers 98 and/or the signal transmitters to the material flow controller 146 the minimum requirements for the information and/or values and if necessary their exact syntax and/or semantics to be provided to the aggregates 11; 12; 13;

14; 16; 17; 18 or their intelligence are to be defined in a so-called interface description. In particular - for example defined by the interface description - at least the unique designation of the affected changed or preferably new drum $\{04.j\}_m$; $\{04.j\}_{m+1}$, the unique designation a_n of the order A(n) as well as the above mentioned specification about the product status {P.x} are data to be provided in the drum-specific data $D_G(m)$; $D_G(m')$. Preferably information about number z and/or drum number g and/or about the transport means p and preferably about the time stamp t can also be arranged in the definition of the interfaces.

The information $D_G(m)$; $D_G(m')$ or data $D_G(m)$; $D_G(m')$ in the preferred design are configured in the form of an open file format, in particular of an open text format. Preferably the file 171; 171' is available as a text file 171; 171' in the XML markup language or a text file arising from extension and/or further development of the markup language, e.g. as a so-called XML or XML-based document 171; 171'. The transfer of the data in file form occurs e.g. via an interface 163, e.g. an XML interface 183.

If now for example a drum $04.j_m$ is processed in a specified aggregate 11; 12; 13; 14; 16; 17; 18 for the drum $04.j_m+1$ (as $04.j_{m'}$) that is formed or to be formed on the output of the aggregate 11; 12; 13; 14; 16; 17; 18 - for example caused by the corresponding signals or signal sequences I.g of the signal transmitter assigned to the aggregate 11; 12; 13; 14; 16; 17; 18 - a changed or preferably newly created data record $d_G(m')$ arises, which has the updated processing status as production status {P.j+1} and if necessary a new number z' and if necessary a new time stamp t' via direct write access 172

or preferably via the formation, transfer and evaluation of a corresponding file 171' in the material management 168.

The signal transmitters assigned to the relevant aggregate 11; 12; 13; 14; 16; 17; 18 can configured as control means implemented in the respective controller 98 or assigned to it, which in response to an actuation of an assigned switching means, e.g. of a button or a sensor 177; 178, or in response to an activation of an assigned command in an input device or in response to a command from the machine controller of the aggregate 11; 12; 13; 14; 16; 17; 18 triggers the action assigned to the meaning of this switching means 177; 178. For example, by means of a corresponding command or by the machine controller of the aggregate 11; 12; 13; 14; 16; 17; 18, no later than after completion of the processed drum 04.j+1 via the signal sequence I.g relating to the product status {P.x} directly or indirectly via the file 171' in the above mentioned manner, the operating personnel can trigger an update of the product status {P.x} in the material management 168 by changing or newly creating the relevant data record $d_G(m)$; $d_G(m')$. The file 171'is for example created here by means of the corresponding data processing means.

In the results the material management 168 - at least with regard to the region of the plant 01 incorporated by the system for tracking and/or control of the material flow and/or controlled by the material flow controller 164 - has a record $D_G(m)$ of drum-specific information for all drums 04.x controlled by the system with at least a unique designation $\{04.j\}_m$ of information about the current product status {P.x} and a reference to the associated order (n), as well as if necessary a drum number g and/or the number z of the material units $02.j_m$ comprised by the drum and/or the time of the last

update as well as preferably a reference to the current position 21; 23; 24; 29; 31; 32; 33; 36; 41; 56; 62; 71; 111; 112. This record $D_G(m)$ of drum-specific, e.g. information required as minimum information according to the interface definition, can, as described, be present as a data record dG(m) or its subset in a memory structure 169 and/or as a record of corresponding above mentioned information in information $D_G(m)$ configured as a file $D_G(m)$. Regardless of whether this record of information relevant for a specific drum 04.j is maintained in the data structure 169 or instead additionally maintained as a file $D_G(m)$ and updated in the above mentioned manner by updating or change, this record $D_G(m)$ of information or data $D_G(m)$ constitutes continuously current information about the state of the relevant stack 04.j in the manner of a stack card, as for example otherwise accompanies the stack 04.j in the form of a piece of paper on its way through a plant 01. In contrast to this, the record DG(m) is maintained here electronically and as a result is directly useful for controlling the material flows by means of the material flow controller 146. This record $D_G(m)$ of information or data $D_G(m)$ can only be included in the figurative sense as an “electronic drum- or stack card” in the data structure 169 designed as a database 169 on the basis of the information transmitted by the signals or signal sequences I.g or alternatively maintained in the literal sense of an “electronic drum card”, in particular “electronic stack card” in the form of a file 171; 171’. This electronic stack card is exchanged between the system for controlling the material flow, in particular of the material management comprising the system or the material flow controller 146 comprising the material management, and the controllers equipped with the corresponding intelligence.

In this preferred design the system for controlling the material flow comprises for example a data processing means 184, for example a program routine 184 which is configured to provide a record of specific information $D_G(m)$ from a data record $d_G(m)$ of the memory structure 169 in the form of an above mentioned file 171, in particular a text file 171, preferably of an XML format. At the latest with the entry of a specific drum 04.jm into the first of the processing aggregates 11; 12; 13; 14; 16; 17; 18 incorporated in the material flow controller 139 for example a file 171 is made available for the specific drum 04.j in the manner of an electronic drum or stack card and for example saved in a defined memory location. From there - e.g. via the above mentioned signal connection 182 - this file 171, e.g. parallel to the relevant drum 04.j itself, is transmitted to the subsequent processing aggregate 11; 12; 13; 14; 16; 17; 18 for processing and after processing corresponding changed or newly created (see above) and again transmitted back to a defined memory location. From there for example an access, an evaluation and an updating (changing or new creation) of the data record $d_G(m)$; $d_G(m')$ by means of corresponding data processing means 186, e.g. a program routine 186, occurs. At least the part of the data processing means 186 responsible for the updating can be provide as part of the management software assigned to the data structure 169.

As an alternative to exchange of the drum-specific data on both sides a transmission of drum-specific, current data $D_G(m')$ to the material flow controller can occur, however the data $D_G(m)$ itself to be updated - e.g. on a read/write memory (for example a transponder) can be included by the drum or by the respective transport means.

In one preferred design of the system for controlling the material flow it comprises a system for acquiring and/or managing resource data or is logically connected or connected by means of electrical signals to such a system. Preferably this system for acquiring and/or managing resource data configured for the acquiring and management of data D_M, e.g. resource data D_M, on the status and/or on the availability of the resources included in the plant 01, in particular included aggregates 11; 12; 13; 14; 16; 17; 18 and e.g. their advanced position and/or dispensing position 23; 32; 29; 41. This system comprises a memory structure 176 which, under a unique designation of at least the incorporated aggregates 11; 12; 13; 14; 16; 17; 18 included in the plant 01 maintains at least one information item on the basic availability and/or one information item about the current status (of the aggregate and/or its advanced position or dispensing position). In one advantageous design an information item can be comprised managing the status of the dispensing position 29; 41 and/or a buffer position if necessary provided on the input side managed on the machine side and/or a buffer position managing the status of the advanced position 23; 32 and/or a buffer position if necessary provided on the output side, managed on the machine side as free or occupied. The memory structure 176 can be provided in the planning and/or control system 139, wherein a data access must be provided by the material flow controller 146 and/or the material logistics system 158. In preferred design the material flow controller 146 and/or the material logistics system 158 has such a memory structure 176 assigned, which for example receives the data D_M relating to resources, in particular the aggregates 11; 12; 13; 14; 16; 17; 18 e.g. the data on availability and/or the current status (in particular operating status such as e.g. “in production”, “read”, “standby”) and/or on the status of the advanced

position 23; 32 and/or if necessary a buffer position on the input side managed on the machine side and/or the status of the dispensing position 29; 41 and/or a buffer position provided if necessary on the output side, managed on the machine side, via the signal connection 179 of the planning and/or control system 139 or via a signal connection (182) directly from the controllers 98 directly assigned to the relevant aggregates 11; 12; 13; 14; 16; 17; 18. The transfer of this data from the controllers 98 can occur via signal sequences I.m and/or via the same or comparable signal connections (182), as described for the transmission of the signal sequence I.g relating to the drum-specific information. This resource-specific information DM or data DM can thus likewise be configured as described above as ribbon-type or tubular information sequence over corresponding signal paths or preferably in the form of files, for example of an open file format, in particular of an open text format, preferably likewise present as a so-called document with underlying XML format.

As indicated, the coordination and/or control of the transport processes and if necessary a management of buffer positions 24; 36; 56 for the plant part incorporated in the material flow controller 146 occurs using data from an order description, i.e. of information from the above mentioned order data D_A, and/or using data from a resource planning, i.e. of information from the above mentioned work plan data D_R, and/or using at least drum data $D_{Art}(j)$ relating to at least the product status {P.j} of the specific drums 04.j and/or using at least data D_M relating to the status of available aggregates 11; 12; 13; 14; 16; 17; 18; 19; 118; 119. In addition, the coordination and/or control can preferably also be based on expertise saved as rules R for the material

flow. This expertise or the associated rules R are heavily application-specific and in the case presented here can relate to required waiting times (e.g. for drying an ink or coating).

Hence, e.g. by means of the material flow controller 146 using data from an order description, i.e. information from the above mentioned order data D_A, in particular on the basis of the planned processing steps P.x and using data from a resource planning, i.e. information from the above mentioned work plan data D_R, in particular from information for resource utilization, and using at least the drum data $D_{Art}(j)$ relating to the product status {P.j} of the specific drums 04.j, in particular of information about the current state of the material units 02.j to be processed into the product 03, and/or using at least data D_M relating to a status of available aggregates 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 and preferably on the basis of the above mentioned rules R a calculation of the required material movements, i.e. transports occurs, as well as if necessary a management of the buffer positions 24; 36; 56 for the product part incorporated in the material flow controller 146.

Hence, in contrast to the conventional solutions, the system for controlling the material flow - at least with regard to the incorporated part of the plant 01 - knows at all times where which drums $04.j_m$ of which processing status {P.j} and which order A(n) are located and which processing step P.j+1 should occur at which aggregate 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 next if necessary under which marginal conditions R in accordance with the plan.

In principle, the material flow controller 146 in a fully automated design for the incorporated transport routes 22; 28;

34; 39; 54; 61; 64; 116; 117 and the aggregates affected by this 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 parallel for example to the production progress tracked in the planning and/or control system 139 can carry out the necessary material movements or transports P.6; P.9; P.12; P13; P.14; P.19; P.21; P22; P.23; P.26; P.30 required for this purpose to a large extent automated and correlated to the work plan. In this connection, for example at positions 21; 23; 24; 29; 31; 32; 33; 36; 41; 56; 62; 71; 111; 112, through which feedback about a transfer or pickup is necessary, corresponding sensors connected by means of electrical signals to the system for controlling the material flow are provided, as indicated by way of example by the sensors 177; 178. By means of the signal connection 138; 179 between the higher level planning and/or control system 139, which receives continuously updated feedback about the state and progress at the aggregates, in this connection for example there is continuous information of the material flow controller 146 about the current situation in the plant 01, so that the latter can autonomously plan and execute the delivery and pickup of drums 04.j to the assigned and monitored positions 21; 23; 24; 29; 31; 32; 33; 36; 41; 56; 62; 71; 111; 112.

In a design to be preferred with regard to security and/or lower expenditure, by means of the material flow controller at least one transport P.6; P.9, P.12; P.13; P.14; P.19; P.21; P.22; P.23; P.26; P.30 of a drum 04.j_m to the aggregate 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 or away from the aggregate 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 is only triggered, i.e. given to a transport means 68; 69; 74; 78; 79 managed by it as a transport order T_M, after a delivery or pickup request has come from the relevant aggregate 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 or its controller 98. In the

process, the calculation of this transport can take place only at this time or right before it. This delivery request and/or the pickup request can for example occur as a logic mentioned above over a signal connection, for example the signal connection 182, to the material flow controller 146 and implemented on site by a logic implemented in the machine controller and/or by the actuation of a switching means caused by the operating personnel. Thus, for example at least a first delivery of a drum 04.j_m for a concrete order A(n) can require a confirmation by the operating personnel, while for example the subsequent transports for delivery of drums 04. from the same order A(n) can be caused for example independently via the status of the advanced position, e.g. “free” or “occupied”, and/or via the signals from the machine controller. The pickup can likewise be caused by a logic implemented in the machine controller and/or by actuating a switching means by the operating personnel and/or by the status of the dispensing position 29; 41, e.g. “empty” or “ready for pickup”.

The request or confirmation of the request by the operating personnel here however does not require any knowledge about the concrete designation of the drums or even their location, but rather at the most the input or only confirmation of an order A(n) and if necessary a confirmation of the delivery of a further drum 04.j_{m+1} belonging to the order A(n). The material flow system 146 then decides on the above mentioned basis which transports should be executed how.

In the process a corresponding delivery request and/or a corresponding transport order T_M for the relevant drum 04.j_m by the material flow system 146 is output to the warehouse 09

being addressed or the selected transport means 68; 69; 74; 78; 79 (e.g. see e.g. Fig. 20).

The output of the transport order TM to the relevant transport means 60; 65; 68; 69; 74; 78; 79 occurs here via a - e.g. depending on the case hard-wired or - unbound - signal connection and an interface 187; 189; 191, which e.g. can be appropriately adapted to the respective type of transport means 60; 65; 68; 69; 74; 78; 79. As mentioned, the actual transport control relating to the implementation of the transport order T_M occurs by means of the above mentioned transport means controls, e.g. control computers, assigned to the relevant transport means 60; 65; 68; 69; 74; 78; 79. In the process, the transport means 60; 65; 68; 69; 74; 78; 79 of all transport routes 22; 28; 34; 39; 54; 61; 64; 116; 117 integrated in the material flow controller with their transport means controllers and if necessary assigned guide and/or orientation aids are preferably configured as automatic transport systems, which upon receipt of the transport order T_M implement this independently - if necessary after a preceding confirmation. The transport means 65; 68; 79 according to the above mentioned preferably designed as transport vehicles 65; 68; 79 can be preferably configured as driverless transport vehicles 65; 68; 79 here, and as vehicles, in particular industrial trucks 65; 68; 79, of a “driverless transport system” (FTS). In the process, the interface 187, via which the data on the transport order TM are transmitted from the material flow controller 146, to a transport means controller controlling several of the transport vehicles 65; 68; 79, for example a vehicle master computer, is formed. In the material flow controller 146 in addition means for visualization of the transport orders TM and/or the current locations of the transport systems 68; 69;

70 can be provided. For the transport means 60; 68 for example configured as a mechanically guided transport vehicle 60 or conveyor device 65 for example an interface is provided for the transport means controller controlling the transport means 60; 68. Finally, in a design of the system for controlling the material flow from a warehouse management integrated in or connected to the material flow controller 146 an interface 191 to a transport means controller assigned to one or more transport means 74; 78 assigned to the warehouse 09; 63 is provided.

What has been mentioned for outputting the transport order T_M should also be understood as an instruction for removal from the incoming goods warehouse. In this connection, by means of the material flow controller 146 for the case of an integrated warehouse management the corresponding transport order T_M is transmitted directly to the relevant transport means 74; 78 of the warehouse 09 or warehouse management system 152.

The above mentioned system for controlling the material flow or method for its application can for example - however without restriction to the aforementioned designs - be managed and/or designed as described in the following.

In the creation of a new customer order the product description is generated with a list of the processing steps P.x to be executed and the required order data AD are obtained. Said data can be changed during the processing, wherein changes in the list of processing steps P.x only have an effect on work steps of processing steps P.x that have not been started. An interruption of a started processing step P.x for the same production P, i.e. a stop in the delivery of further drums 04.jm for this order A(n) is e.g. possible.

The production planning with listing of orders A(n), which are supposed to be processed on an aggregate 11; 12; 13; 14; 16; 17; 18; 19; 118; 119, is created - e.g. with an advance notice of up to a few days - from the place responsible for the production planning. Changes in the production planning are possible due to client requests, quality problems or the breakdown of processing stations, but must be incorporated in the production planning system and transmitted to the material flow controller over the corresponding signal path. Here too, an interruption of a processing step P.x that has been started for the same production P, i.e. a stop of the delivery of further drums 04.jm for this order A(n) is possible.

The rules R for controlling the material flows that must be observed (expertise and/or marginal conditions), are e.g. defined in an application specific manner. Manual interventions against a rule R by an operator can if necessary be possible in individual cases.

In order to prepare the necessary drums 04.j for a pending order A(n) or even several pending orders A(n) for example at an unpacking station and/or a conditioning and/or relocation device, it is possible, for example by inputting or selecting the order A(n) at an operator interface assigned to the aggregate 118 and connected by means of electrical signals to the material flow controller 146, to request the drums 04.j required for this purpose - in particular without having to designate them in particular. After that the corresponding drums 04.j or the transport units 27; 66; 67 comprising the drums are retrieved from the warehouse 09 and provided by means of the retrieval commissioned and/or controlled by the material flow controller 146 to the transport commissioned by

the material flow controller 146 via the corresponding transport means 68; 69; 74; 78; 79.

After the preparation, i.e. the unpacking P.10 and if necessary relocation P.11 to a system or standard transport means 108; 109, the drums 04.0 or transport units 27; 66; 67 are transported to the first processing aggregate 11; 12; 13; 14; 16; 17; 18; 19 (i.e. to an advanced position or a buffer position managed and controlled by the aggregate) provided according to the production plan 157. The execution of the transport P.12 is preferably caused by the pickup request form the manipulation aggregate 118; 119 via a corresponding signal I.m triggered independently by the controller 98 or by the operating personnel at the switching means or signal sequence I.m by the material flow controller 146. The destination of the transport P.12 arises from the order data D_A, e.g. the first processing step P.x listed in the order data D_A, and e.g. from which processing aggregate 11; 12; 13; 14; 16; 17; 18; 19 assigned to the processing step P.x the relevant order A(n) is currently listed. For each automated transport here it holds true for example that no transport is executed if the destination of the transport cannot be clearly determined. In this case a corresponding error message must be generated.

In the case of load change, i.e. in the case of the change of an existing or generation of a new drum data record $d_G(m')$ caused by a conditioning or processing and/or preferably of a changed or preferably new drum information $D_G(m')$, in particular of a changed or preferably new electronic drum card $D_G(m')$, the unchanged information about the drum $04.j_m$ is retained or transferred. The transfer of the drums 04.j or transport units 27; 66; 67 and the management in the region of a processing aggregate 11; 12; 13; 14; 16; 17; 18 is in the

responsibility of the controller 98 of the corresponding aggregate.

For the case of drums 04.j transported to transport means 26; 108; 109 the affected transport unit 27; 66; 67 within a processing aggregate 11; 12; 13; 14; 16; 17; 18 is "resolved" (pallet is empty) and the processed material units 02.j+1 are made ready for pickup on a new transport unit 27; 66; 67 (a new transport unit 27; 66; 67, i.e. a new unique identifier, appears for example as transport means info p in the relevant drum data $d_G(m')$; $D_G(m')$). The reference to the order A(n) is preserved, the product status {P.x} is updated. The drum 04.j+1 or the transport unit 27; 66; 67 with the processed material units 02.j+1 is provided at the dispensing position 29; 41 and preferably as a result of this the signal I.m or signal sequence I.m representing the pickup order is generated by the controller 98 independently or if necessary by the operating personnel at the switching means and transferred to the material flow controller 146. The material flow controller 146 then gives the corresponding transport order to the relevant transport means 68; 69; 74; 78; 79.

The next processing step P.j+1 and with it the next destination of the drum 04.j or the transport unit 27; 66; 67 arises in turn for one thing from order data DA, e.g. the next processing step P.j+1 listed in the order data DA, e.g. from this, on which processing aggregate 11; 12; 13; 14; 16; 17; 18; 19 assigned to the next processing step P.j+1 the relevant order A(n) is currently listed. If no production run is currently planned at this time for the relevant order A(n), or if one of the predefined rules R forbids immediate further transport, the material flow controller 146 generates a transport P.14; P.19 in a buffer warehouse 37; 57. In the

buffer warehouse 37; 57 the drums 04.j are stored sorted by type if at all possible, i.e. if possible in each case cumulative to orders A(n). Such a rule R forcing an intermediate storage P.15 can be e.g.: "next processing step P.j+1 for drum 04.j of an order A(n) may only begin if all drums 04.j or transport units 27; 66; 67 of the same order A(n) have run through the preceding processing step P.j" or "after a specific processing step P.j the drum 04.j must first rest for a defined minimum time period, before it may be brought to the next processing step P.j" or "after a specific processing step P.j an operator must first release the drum 04.j or the transport unit 27; 66; 67, before it may be brought to the next processing step P.j+1".

The delivery e.g. from the current processing step P.j or from the buffer warehouse 37; 57 to the next processing station of processing aggregate 11; 12; 13; 14; 16; 17; 18; 19 occurs as soon as a request (corresponding to the above mentioned) from the next provided processing aggregate 11; 12; 13; 14; 16; 17; 18; 19 is pending and a rule R to be applied is not against it. If a request cannot be met immediately, it stops and will be processed as soon as the assigned material, i.e. a relevant drum 04.j, is available and/or the prerequisite defined in a rule R has been fulfilled.

The material flow between the incorporated processing aggregates 11; 12; 13; 14; 16; 17; 18; 19 and if necessary available buffer warehouses 37; 57 is realized by the material flow controller 146 or the logic implemented in it. After the last run processing step P.j clearly results from the product status {P.j}, the next objective to be met from e.g. the next entry in the list of processing steps P.x of the order data D_A and from the work plan data D_R, i.e. a listing of planned

production runs at the processing aggregates 11; 12; 13; 14; 16; 17; 18; 19, in particular at processing aggregates 11; 12; 13; 14; 16; 17; 18; 19 provided for the next processing step P.j+1, i.e. for example a machine utilization plan, are determined. If an immediate transport is not possible, the relevant drums 04.j or transport units 27; 66; 67 are placed in temporary storage in a buffer warehouse, as above.

Pickup orders from a processing aggregate 11; 12; 13; 14; 16; 17; 18; 19 are for example triggered via the corresponding signals or signal sequences I.m by a message to the effect of "transport unit ready for pickup", material deliveries for example by a message to the effect of "advanced position ready for delivery". Preferably the processing aggregates 11; 12; 13; 14; 16; 17; 18; 19 themselves are responsible for these messages, for example via their controller 98 and if necessary the provided sensors (e.g. sensors 177; 178).

The production plan 157 essentially specifies the order of the orders A(n) which a processing station should run. The planned times for the production processing for example only matter if e.g. a processing aggregate 11; 12; 13; 14; 16; 17; 18; 19 should not be used at specific times. However, in this case in spite of this a first drum 04.x or a first transport unit 27; 66; 67 of an order A(n) can be delivered which is to be processed next. If a processing aggregate 11; 12; 13; 14; 16; 17; 18; 19 is supposed to run the orders A(n) in an order deviating from the planning, this must occur in the production planning 144 by means of corresponding changes in the production plan 157 and at least this change must be transmitted to the material flow controller 146. The material flow controller 146 preferably adheres strictly to the order data D_A from the product description, the work plan data D_R

from the production planning 144, the product status {P.j} of the order-related material drums 04.j_m, the rules R on the availability and/or the status of the aggregates 11; 12; 13; 14; 16; 17; 18; 19.

After running through all the processing steps P.x listed in the product description or the order data D_A for the relevant order A(n), the product drums 08 comprising the completed products 03 are e.g. packed and for example provided on one or more transport means 109; 121, in particular different from the system transport means 108, for transport 26 to the outgoing goods warehouse 63. A subsequent retrieval P.28 of the finished products occurs in turn at operator request at the outgoing goods 07.

The above mentioned aggregates 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 are likewise to be understood in the sense of stations 11; 12; 13; 14; 16; 17; 18; 19; 118; 119 in the multiple production process P, the processing aggregates 11; 12; 13; 14; 16; 17; 18; 19 correspondingly as processing stations 11; 12; 13; 14; 16; 17; 18; 19.

Reference List

01	Production plant
02.j	Material unit, workpiece, material section, section, after j working levels, with j = 0, 1, 2, 3, …s-1 s ϵ IN, S ≥ 2, where s = number of processing levels provided for the production process
03	Product, packaging and/or printed product, packaging and/or printing product
04.j	Material drum, drum, material stack, stack (workpieces 02.j)
05	-
06	Delivery, incoming materials, incoming goods
07	Product output, outgoing goods
08	Product drum (products 03)
09	Warehouse, incoming goods warehouse, high-rise storage
10	-
11	Aggregate, processing aggregate, printing unit, station, processing station (where 11_k kth aggregate with k ϵ IN)
12	Aggregate, processing aggregate, coating machine, station, processing station
13	Aggregate, processing aggregate, station, processing station, punching device, cutting device, automatic punching machine (where 13_I I-th aggregate with I ϵ IN)
14	Aggregate, processing aggregate, station, processing station, folding device
15	-
16	Aggregate, processing aggregate, station, processing station, adhesive device
17	Aggregate, processing aggregate, station, processing station, adhesive device
18	Aggregate, processing aggregate, station, processing station, break away line, break away device

19 Aggregate, manipulation device, turning device, stack turner
20 -
21 Entry position, position
22 Transport path, second, transport route
23 Advanced position, position
24 Buffer position, position
25 -
26 Transport means, carrier, pallet, incoming goods-/format pallet
27 Transport unit (26)
28 Transport path, second, transport route
29 Dispensing position, position
30 -
31 Working, contact position, advanced position, position
32 Advanced position, position
33 Working, contact position, advanced position, position
34 Transport path, third, transport route
35 -
36 Buffer position, warehouse position, position
37 Warehouse, buffer warehouse
38 Transport path
39 Transport path, transport route
40 -
41 Dispensing position, position
42 Transport path, transport route
43 Transport path, transport route
44 Transport path, transport route
45 -
46 Transport path, transport route
47 Transport path, transport route
48 Transport path, transport route
49 Transport path, transport route

50 -
51 Processing section, main processing section, section
52 Further processing section, section
53 Section, processing section
54 Transport path, transport route
55 -
56 Buffer position, warehouse position
57 Warehouse, buffer warehouse
58 Commissioning and/or packaging device
59 Commissioning and/or packaging device, shrinking device
60 -
61 Transport path, transport route
62 Position, warehouse position, storage location
63 Warehouse, finished products warehouse, outgoing goods warehouse
64 Transport path, transport route
65 Manipulation means, transport means, transport vehicle, industrial truck, driverless and/or contactless guided
66 Transport unit
67 Transport unit
68 Manipulation means, transport means, transport vehicle, industrial truck, driverless and/or contactless guided
69 Manipulation means, transport means, conveyor device, roller conveyor
70 -
71 Storage location, warehouse position
72 Shelf row
73 Travel lane, travel path
74 Manipulation means, transport means, storage and retrieval units
75 Device for load restraint, clamping element, clamping plate
76 Shelf hall

77 Travel lane, travel path
78 Manipulation means, transport means, storage and retrieval unit
79 Manipulation means, transport means, transport vehicle, industrial truck
80 -
81 Processing tool, printing unit
82 Processing tool, coating unit
83 Processing tool, die cutting unit, creaser
84 Processing tool, folder
85 -
86 Processing tool, adhesive device
87 Processing tool, adhesive device
88 Processing tool, break away tool
89 Device for automatic and/or interruption-free material feed
90 -
91 Device for automatic and/or interruption-free material removal
92 Supporting device, lifting platform
93 Supporting device, fork, rake
94 Supporting device, lifting platform
95 -
96 Supporting device, board, roller blind
97 Conveyor device, continuous conveyor
98 Controller
99 Master computer
100 -
101 Operating element, operator interface
102 Operating element, operator interface
103 Conveyor device, roller conveyor
104 Conveyor device, roller conveyor
105 -

106 Conveyor device, roller conveyor
107 Conveyor device, roller conveyor
108 Transport means, carrier, pallet, system transport means, system pallet
109 Transport means, carrier, pallet, standard transport means, standard pallet, system pallet, additional
110 -
111 Delivery position
112 Delivery position
113 Removal position
114 Advanced position
115 -
116 Transport path
117 Transport path
118 Aggregate, manipulation aggregate, conditioning and/or relocation device, turning device
119 Aggregate, manipulation aggregate, holding and/or relocation device
120 -
121 Transport means, carrier, pallet, outgoing goods pallet
122 Support panel, cover plate
123 Base area, substructure
124 Transport means
125 -
126 Recess
127 Web
128 Foot
129 Recess
130 -
131 Support surface
132 Support surface
133 Stack (109)
134 Drum, stack (108)

135 -
136 Collecting and/or return station
137 Aggregate, manipulation aggregate, turning aggregate, pallet inverter
138 Signal connection, network connection, bus connection
139 Production and resource planning, planning and/or control system, production planning and process control system
140 -
141 File, text file, XML document, access
142 Access, file, text file, XML document
143 Order acceptance
144 Production planning
145 -
146 Material flow controller
147 Process chain
148 Process chain
149 Process section
150 -
151 Process section
152 Warehouse management system
153 Production management
154 Management
155 -
156 Order backlog
157 Production plan
158 Material logistics system
159 I nventory
160 -
161 Process values, default values
162 Process data
163 Interface, XML interface
164 Interface, ODBC interface

165 -
166 Data source, file, database
167 Acquisition means, operator interface
168 Material management, material management system
169 File, file system, database, memory structure
170 -
171 File, text file, XML document
171' File, text file, XML document
172 Access, write access
173 Data processing means, program routine
174 Data processing means, program routine
175 -
176 Memory structure
177 Sensor, button
178 Sensor, button
179 Signal connection, network connection
180 -
181 Signal connection, network connection, bus connection
182 Signal connection, network connection, bus connection183 183 Interface, XML interface
184 Data processing means, program routine
185 -
186 Data processing means, program routine
187 Interface
188 Interface
189 Interface
190 -
191 Interface

a_n Designation, Job-ID
A(n) Order
D_A Information, data, order data, plan data
D_R Information, data, work data, plan data

D_M Information, data, resource data

$D_{Art}(m)$ Data, article data

$d_g(m')$ Data, data record, drum data

DG(m') Information, data, drum data

I.g Signal, signal sequence, information-containing

I.m Signal, signal sequence, information-containing

K Packing level

M Material removal direction

P Production process, process, overall process

P.x Process step, processing step, with x from [P.1; P.1'; P.2'; P.2''; P.2'''; P.3; P.4; P4' (P.4''); P.5];

P.1 Process step, processing step, material application, printing

P.1' Process step, processing step, print finishing, coating

P.2 Process step, processing step, mechanical processing, by cutting tool, punching

P.3 Process step, processing step, mechanical processing, deformation, folding

P.4 Process step, processing step, bonding (tab)

P.4' Process step, processing step, bonding (window)

P.5 Process step, processing step, break away

P.y Process step, manipulation step with y from [P.6, P.7…];

P.6 Process step, manipulation step, transport (WE, warehouse)

P.7 Process step, manipulation step, storage

P.8 Process step, manipulation step, retrieval

P.9 Process step, manipulation step, transport (warehouse - stack turner, unpacking station)

P.10 Process step, manipulation step, conditioning, unpacking

P.11 Process step, manipulation step, conditioning, relocation, repalletizing, turning and/or loosening

P.12 Process step, manipulation step, transport (relocation and/or conditioning device - 1st processing level)

P.13 Process step, manipulation step, transport (1st processing level - 2nd processing level)

P.14 Process step, manipulation step, transport (1st processing level - 1st buffer warehouse)

P.15 Process step, intermediate storage

P.16 Process step, manipulation step, conditioning, turning and/or loosening

P.17 Process step, manipulation step, transport (1st buffer warehouse, 2nd processing level)

P.18 Process step, manipulation step, transport (2nd processing level - further processing)

P.19 Process step, manipulation step, transport (2nd processing level - 1st/2nd buffer warehouse

P.20 Process step, intermediate storage

P.21 Process step, manipulation step, transport (1st/2nd buffer warehouse, further processing)

P.22 Process step, manipulation step, transport (without further processing)

P.23 Process step, manipulation step, transport (with further processing)

P.24 Packing

P.25 Palletizing

P.26 Process step, manipulation step, transport

P.27 Process step, manipulation step, storage

P.28 Process step, manipulation step, commissioning and/or retrieval

P.29 Process step, manipulation step, repalletizing

P.30 Process step, manipulation step, transport

P.31 Process step, manipulation step, repalletizing, relocating, positioning

S.q Processing level, with q = 1, 2, 3 … s; s ϵ IN, s ≥ 2 (printing, further processing, e.g. embossing, punching, breaking away, folding or bonding)

S.1 Processing level, material application, printing

S.1’ Processing level, material application, print finishing, coating

S.2 Processing level, mechanical processing, by cutting tool, punching

S.3 Processing level, mechanical processing, deformation, folding

S.4 Processing level, joining, bonding, stapling (tab)

S.4’ Processing level, joining, bonding (window)

S.5 Processing level, mechanical processing, breaking away

T_M Transport order

Z Number, z ϵ IN

P A T E N T K R A V

1. Fremgangsmåde til styring af en materialestrøm i et flertrinnet anlæg (01), som omfatter en trykkemaskine (11) og mindst et yderligere bearbejdningsaggregat, som bearbejder arkformede materialeafsnit (02.j), hvor

- en flerhed af materialeafsnit (02.j), som skal bearbejdes, i et bundt (04.j) transporteres af mindst et første transportorgan (65; 68; 79) til et som trykkemaskine (11) udformet bearbejdningsaggregat (11),
- materialeafsnittene (02.j) passerer trykkemaskinen (11) mindst en gang og påtrykkes i den forbindelse mindst en gang,
- og materialeafsnittene (02.j), som passerer trykkemaskinen (11) mindst en gang og i den forbindelse påtrykkes mindst en gang, i mindst et bundt (04.j) transporteres af det mindst ene første eller af et derfra forskelligt andet transportorgan (65; 68; 79) til videre bearbejdning væk fra trykkemaskinen (11) til et yderligere, fra en trykkemaskine forskelligt bearbejdningsaggregat (12; 13; 14; 16; 17; 18) eller til mellemlagring til en lagerposition (36; 56) i et lager (37; 57),
- der mindst til transporter væk fra trykkemaskinen (11) hen til det yderligere bearbejdningsaggregat (12; 13; 14; 16; 17; 18) eller til lagerpositionen (36; 56) genereres transportordrer (T_M) ved hjælp af databehandlingsorganer i en materialestrømstyring (146),

kendetegnet ved, at den respektive transportordre (T_M) genereres af materialestrømstyringen (146) under

hensyntagen til fra materialestrømstyringen (146) elektronisk tilgængelige eller transmitterede informationer (D_G) om bundtet (04.j), som vedrører transportordren, idet informationerne (D_G) omfatter mindst angivelse af en entydig betegnelse ($\{04.j\}_m$) for det pågældende bundt (04.j) og angivelse af en entydig betegnelse for den til det specifikke bundt (04.j) knyttede ordre (A(n)) og en angivelse vedrørende bearbejdningsstatussen ({P.x}) for materialeafsnittene (02.j) i bundtet (04.j),

- og de pågældende transporter sker på basis af disse af materialestrømstyringen (146) genererede transportordrer (T_M).

2. Fremgangsmåde ifølge krav 1, **kendetegnet ved, at** transporter fra et foran trykkemaskinen (11) liggende lager og/eller håndteringsaggregat (118) hen til trykkemaskinen (11) og/eller fra lagerpositionen (36; 56) hen til det yderligere bearbejdningsaggregat (12; 13; 14; 16; 17; 18) og/eller fra det yderligere bearbejdningsaggregat (12; 13; 14; 16; 17; 18) til en yderligere lagerposition (56) sker ved hjælp af transportorganer (60; 65; 68; 69; 74; 79) ligeledes på basis af respektive i materialestrømstyringen (146) genererede transportordrer (T_M), og at den respektive transportordre (T_M) genereres og/eller udløses af materialestrømstyringen (146) under hensyntagen til fra materialestrømstyringen (146) elektronisk tilgængelige og/eller transmitterede informationer (D_G) om bundtet (04.j), som vedrører transportordren, idet den bundtspecifikke information (D_G) omfatter mindst angivelse af en entydig betegnelse ($\{04.j\}_m$) for det pågældende bundt (04.j) og/eller angivelse af en entydig betegnelse for den til det specifikke bundt (04.j) knyttede

ordre (A(n)) og/eller en angivelse vedrørende bearbejdningsstatussen ({P.x}) for materialeafsnittene (02.j) i bundtet (04.j).

3. Fremgangsmåde ifølge krav 1 eller 2, **kendetegnet ved, at** den respektive transportordre (T_M) genereres af materialestrømstyringen (146) ved anvendelse af elektronisk tilgængelige og/eller transmitterede data om en ordrebeskrivelse, især af data eller angivelser fra en opstilling af de for en specifik ordre (n) nødvendige bearbejdningstrin (P.x), og/eller om en forløbs- og ressourceplanlægning, især af data eller angivelse fra en maskinudnyttelsesplan med produktionsforløbene for ordrer (n), som skal færdiggøres ved de pågældende bearbejdningsaggregater (11; 12; 13; 14; 16; 17; 18).

4. Fremgangsmåde ifølge krav 3, **kendetegnet ved, at** materialestrømstyringen (146) modtager angivelserne om ordrebeskrivelsen og/eller om en forløbs- og ressourceplanlægning fra et planlægnings- og/eller styresystem (139) i anlægget (01).

5. Fremgangsmåde ifølge krav 1, 2, 3 eller 4, **kendetegnet ved, at** den respektive transportordre (T_M) til dennes gennemførelse af materialestrømstyringen (146) ledes til en transportorganstyring, som styrer mindst det respektive transportorgan (65; 68; 79), og/eller at transportbevægelser for transportbevægelser, som skal udføres på flere indbyrdes forskellige transportstier, og/eller for flere i anlægget (01) tilvejebragte transportorganer (60; 65; 68; 69; 74; 79) koordineres og/eller specificeres af materialestrømstyringen (146), idet den genererer tilsvarende transportordrer (T_M) og

leder dem til transportorganstyringen eller den respektive vedkommende transportorganstyring.

6. Fremgangsmåde ifølge krav 1, 2, 3, 4 eller 5, **kendetegnet ved, at** den respektive transportordre (T_M) genereres og/eller udløses af materialestrømstyringen (146) under hensyntagen til fra materialestrømstyringen (146) elektronisk tilgængelige og/eller transmitterede informationer (D_M) vedrørende statussen for et bearbejdningsaggregat (11; 12; 13; 14; 16; 17; 18), som vedrører transportordren, og/eller en til dette bearbejdningsaggregat (11; 12; 13; 14; 16; 17; 18) knyttet fremførings- eller afgivelsesposition (23; 32; 29; 41).

7. Fremgangsmåde ifølge krav 1, 2, 3, 4, 5 eller 6, **kendetegnet ved, at** den respektive transportordre (T_M) sker ved hjælp af materialestrømstyringen (146) ved anvendelse af foruddefinerede og for materialestrømstyringen (146) elektronisk tilgængelige og/eller transmitterede regler.

8. Fremgangsmåde ifølge krav 1, 2, 3, 4, 5, 6 eller 7, **kendetegnet ved, at** en transportordre (T_M) hen til et af bearbejdningsaggregaterne (11; 12; 13; 14; 16; 17; 18) eller væk fra et af disse bearbejdningsaggregater (11; 12; 13; 14; 16; 17; 18) genereres og/eller udløses af materialestrømstyringen (146), når der til materialestrømstyringen (146) fra det pågældende bearbejdningsaggregat (11; 12; 13; 14; 16; 17; 18) er tilgået en forespørgsel på indgangssiden efter et bundt (04.j), som skal bearbejdes hhv. en information (D_M), som repræsenterer et afhentningsparat bundt (04.j+1) på udgangssiden.

9. Fremgangsmåde ifølge krav 1, 2, 3, 4, 5, 6, 7 eller 8, **kendetegnet ved, at** der til materialestrømstyringen (146) fra en til det pågældende bearbejdningsaggregat (11; 12; 13; 14; 16; 17; 18) på stedet knyttet styreindretning (98) ledes informationer (D_G) om de sidst bearbejdede og/eller afhentningsparate bundter (04.uj).

10. Fremgangsmåde ifølge krav 9, **kendetegnet ved, at** et til det pågældende bearbejdningsaggregat (11; 12; 13; 14; 16; 17; 18), dvs. trykkemaskinen (11), eller bearbejdningsaggregatet eller et yderligere bearbejdningsaggregat (12; 13; 14; 16; 17; 18), knyttet databehandlingsorgan (173; 174) stiller informationerne (D_G) om de bearbejdede og/eller paratstående bundter (04.j) til rådighed i form af data, især i form af en fil (171; 171'), fortrinsvis en fil i XML-format.

11. Fremgangsmåde ifølge krav 1, 2, 3, 4, 5, 6, 7, 8, 9 eller 10, **kendetegnet ved, at** der mellem til materialestrømstyringen (146) og de respektive bearbejdningsaggregater (11; 12; 13; 14; 16; 17; 18), dvs. trykkemaskinen (11) og/eller bearbejdningsaggregatet eller mindst et yderligere bearbejdningsaggregat (12; 13; 14; 16; 17; 18), knyttede styreindretninger (98) og/eller databehandlingsorganer (173; 174) sker en udveksling af en fil (171), som indeholder angivelser om tilstanden af stablen (04.j), som skal bearbejdes og/eller er bearbejdet af bearbejdningsaggregatet (11; 12; 13; 14; 16; 17; 18).

12. Fremgangsmåde ifølge krav 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 eller 11, **kendetegnet ved, at** materialestrømstyringen (146) ved anvendelse af en angivelse vedrørende bearbejdningsstatussen ({P.x}) samt ved anvendelse af angivelser fra

ordrebeskrivelsen, som vedrører ordren (A(n)), og/eller forløbs- og ressourceplanlægningen beregner det næste ventende mål for bundtet (04.j), dvs. aggregatet eller mellemlageret, som det skal komme til som det næste.

13. Fremgangsmåde ifølge krav 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 eller 12, **kendetegnet ved, at** der i et overordnet planlægnings- og/eller styresystem (139) via en brugergrænseflade beskrives ordrer A(n) til fremstilling af emballage- og/eller trykkeriprodukter (03 og/eller foretages en forløbs- og ressourceplanlægning, og angivelser fra ordrebeskrivelsen og/eller angivelser fra forløbs- og ressourceplanlægningen stilles til rådighed i en til planlægnings- og/eller styresystemet (139) knyttet eller med dette forbundet lagringstruktur som strukturerede data (D_A; D_R).

14. Fremgangsmåde ifølge krav 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 eller 13, **kendetegnet ved, at** der mellem en af materialestrømstyringen (146) omfattet eller med denne signalteknisk forbundet materialeadministration (168) og en eller flere styreindretninger (98), som i hvert enkelt tilfælde er knyttet til en eller flere forarbejdningsaggregater (11; 12; 13; 14; 16; 17; 18) til styring og/eller betjening, sker en udveksling af bundtrelevante informationer (D_G) i begge retninger, idet fra materialestrømsystemet (146) eller den af dette omfattede eller med dette forbundne materialeadministration (168) til styreindretningen (98) transmitterede bundtrelevante informationer (DG) aktualiseres dér ved ændring eller nydannelse og transmitteres tilbage til materialestrømsystemet (146) og/eller materialeadministrationen (168).

15. System til styring af en materialestrøm i et anlæg (01), som omfatter en trykkemaskine (11) samt et eller flere yderligere arkbearbejdende bearbejdningsaggregater (12; 13; 14; 16; 17; 18), med en materialestyring (146), som omfatter et databehandlingsorgan, **kendetegnet ved, at** materialestrøm-styringen (146) programteknisk er indrettet til ud fra i elektronisk form foreliggende data om en ordrebeskrivelse og om en forløbs- og ressourceplanlægning at generere en transportordre (T_M) til transport af en stabel (04.j) af materialeafsnit (02.j), som skal bearbejdes, fra en defineret startposition til en defineret målposition, og lede den til en til et eller flere transportorganer (65; 68; 79) knyttet transportorganstyring og udøve en fremgangsmåde ifølge et eller flere af kravene 1 til 14.

16. System ifølge krav 15, **kendetegnet ved, at** materiale-strømstyringen (146) via en grænseflade (163; 164), især via en XML-grænseflade (163) og/eller en database-interface (164), står i signalforbindelse med et planlægnings- og/eller styresystem (139) og/eller via i hvert enkelt tilfælde en grænseflade (183), især en XML-interface (183), med flere, hver især til et bearbejdningsaggregat (12; 13; 14; 16; 17; 18) på stedet knyttede styreindretninger (98).

17. System ifølge krav 15 eller 16, **kendetegnet ved, at** systemet omfatter et af materialestrømstyringen (146) omfattet eller med denne forbundet lagringsorgan med en datastruktur (169), som er indrettet til for en flerhed af bundter (04.j), som skal håndteres i anlægget (01), at lagre bundtspecifikke data dG(m) med mindst en entydig betegnelse ({04.j}m) for det pågældende bundt (04.jm) og/eller en angivelse, som betegner en tilknyttet ordre (A(n), og/eller

en angivelse, som betegner en aktuel produktstatus ({P.x}, og/eller en angivelse, som betegner et antal (z) af de i bundtet (04.jm) omfattede materialeafsnit (02.0), og/eller en angivelse (p), som karakteriserer et transportorgan (26; 108; 108), som optager bundtet (04.jm).

18. System ifølge krav 15, 16 eller 17, **kendetegnet ved, at** materialestrømstyringen (146) via flere transportstyringer er forbundet signalteknisk med flere til indbyrdes forskellige transportstier knyttede transportorganer (60; 65; 68; 69; 78; 79).

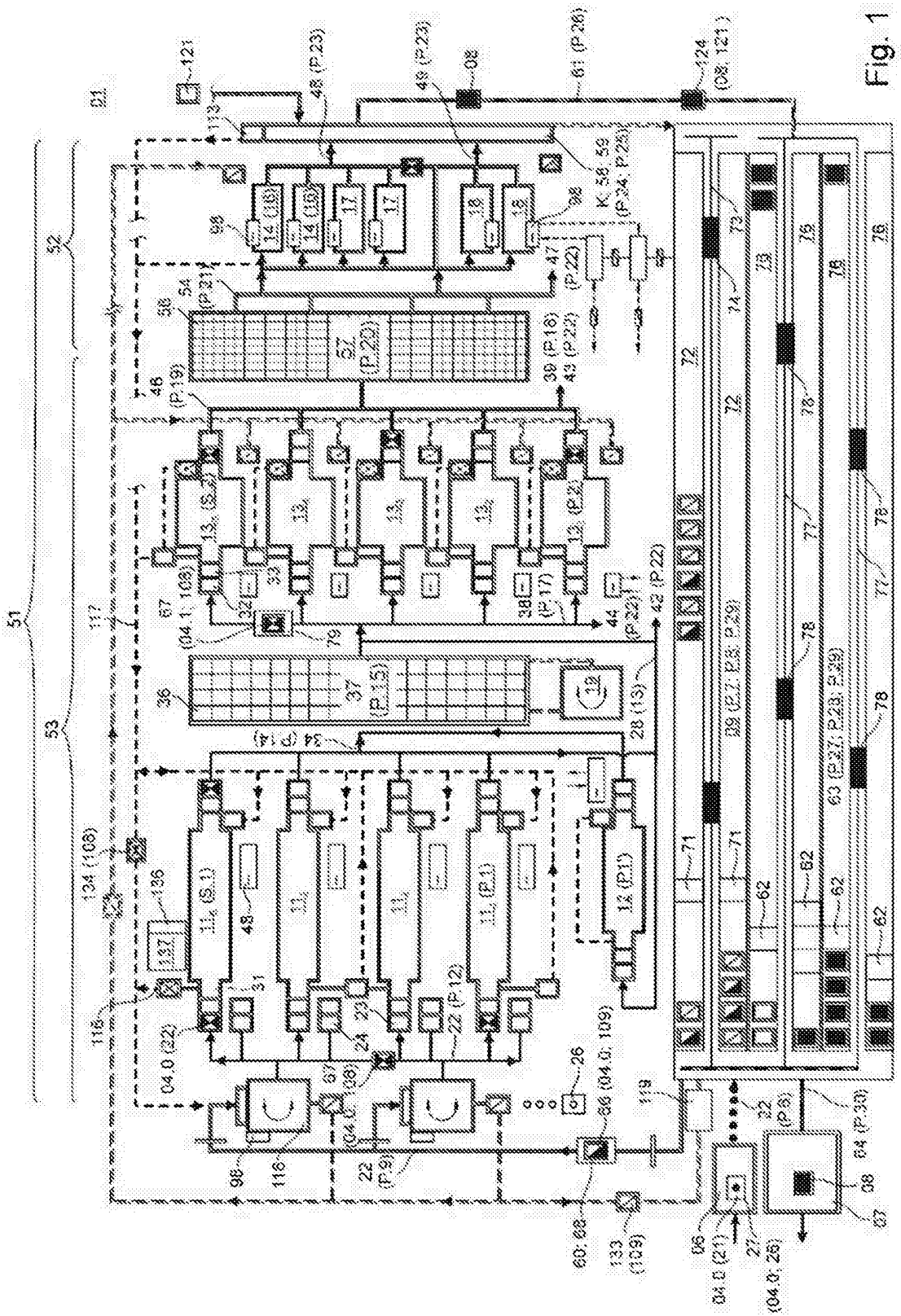

Fig. 1

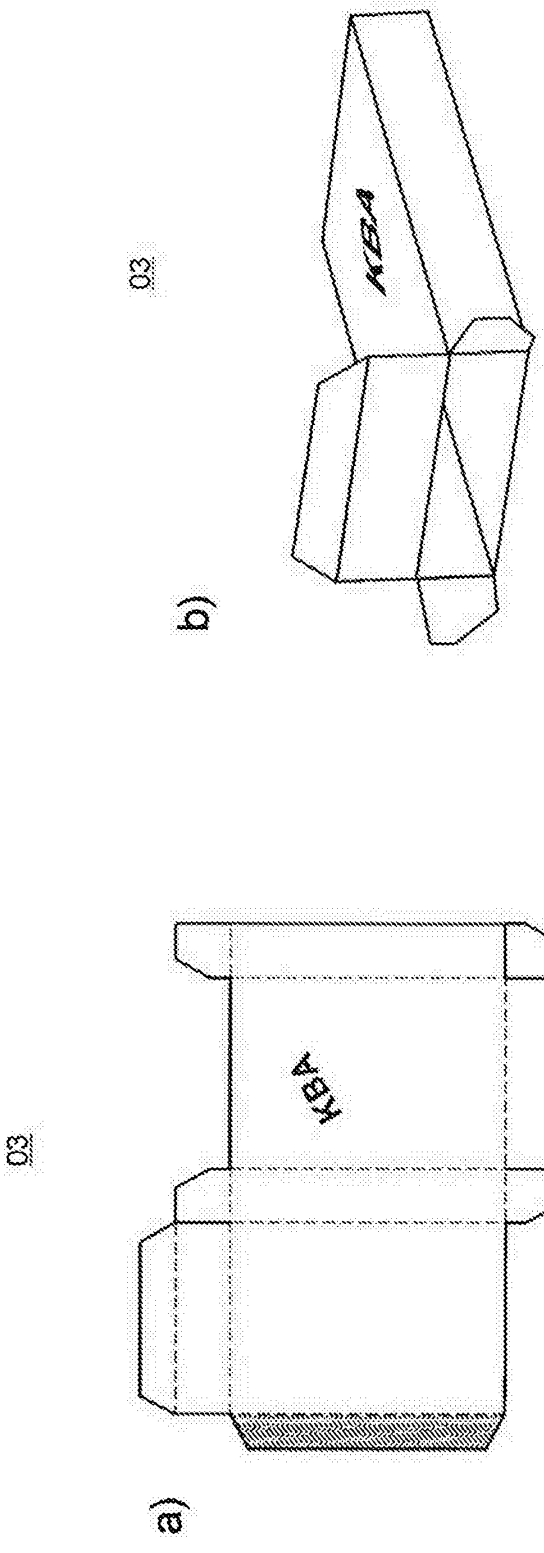

Fig. 2

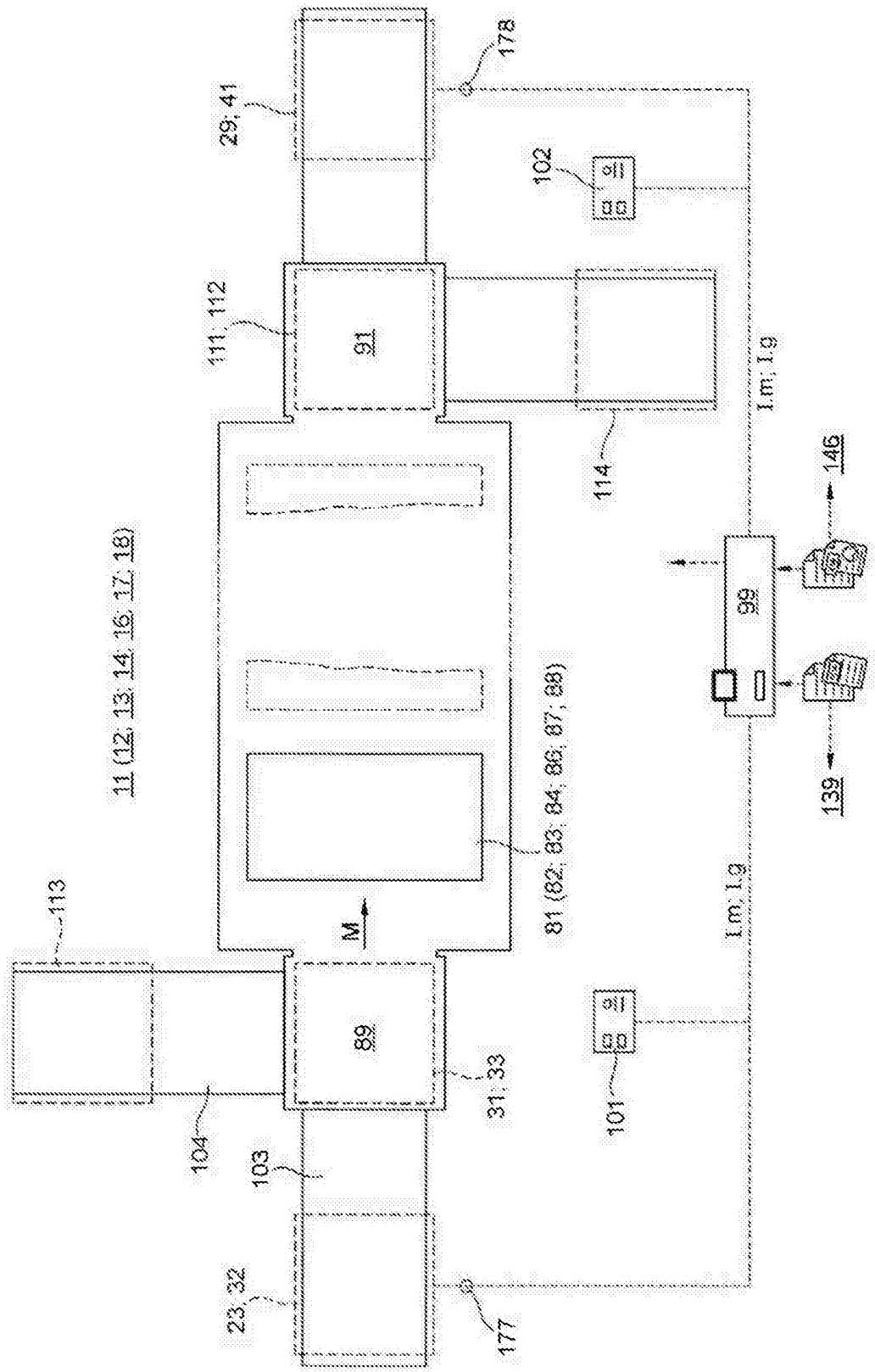
178
29; 41
102
91
111; 112
114
Im; Ig
146
99
139
11 (12; 13; 14; 16; 17; 18)
81 (82; 83; 84; 86; 87; 88)
M
113
89
31; 33
101
104
103
23; 32
177

Fig. 3

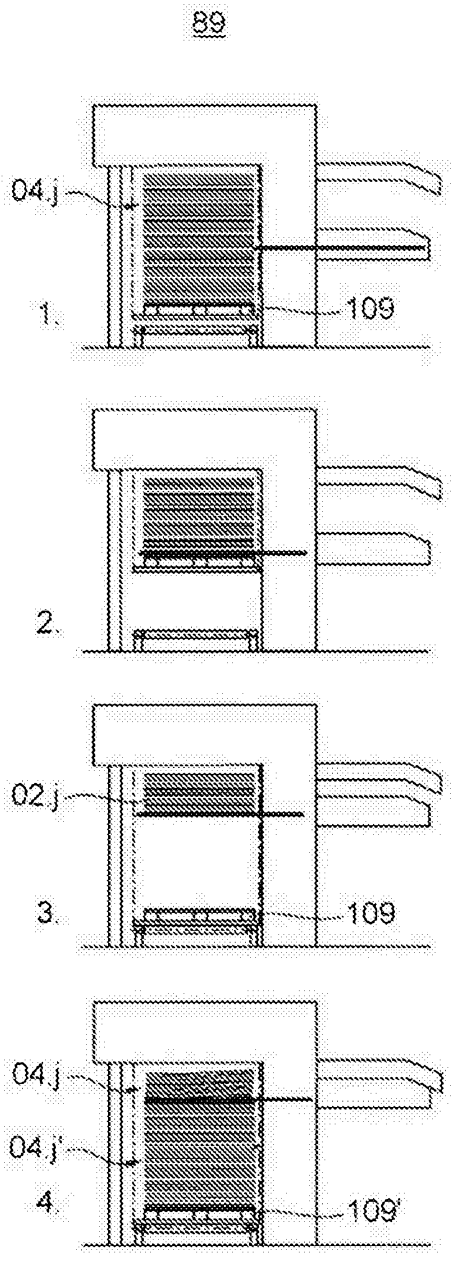
89
04.j
1.
109
2.
02.j
3.
109
04.j
04.j'
4.
109'

Fig. 4

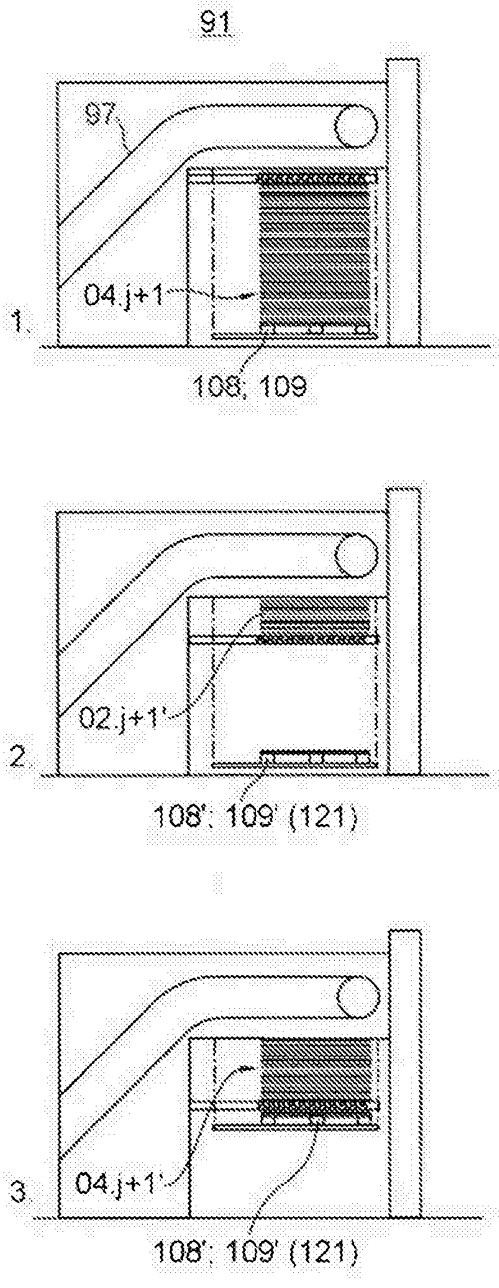
91
97
04.j+1
1.
108; 109
02.j+1'
2
108'; 109' (121)
04.j+1'
3
108'; 109' (121)

Fig. 5

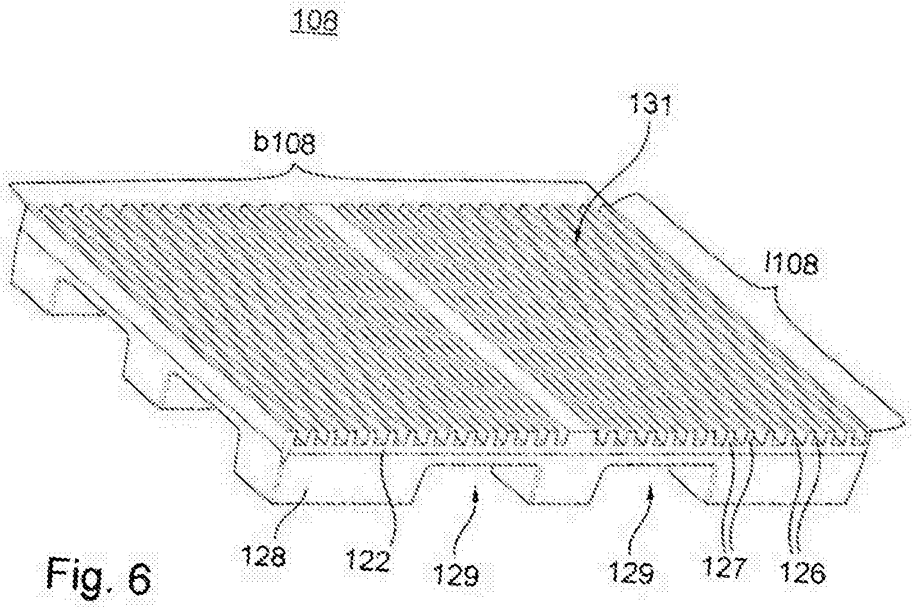

Fig. 6

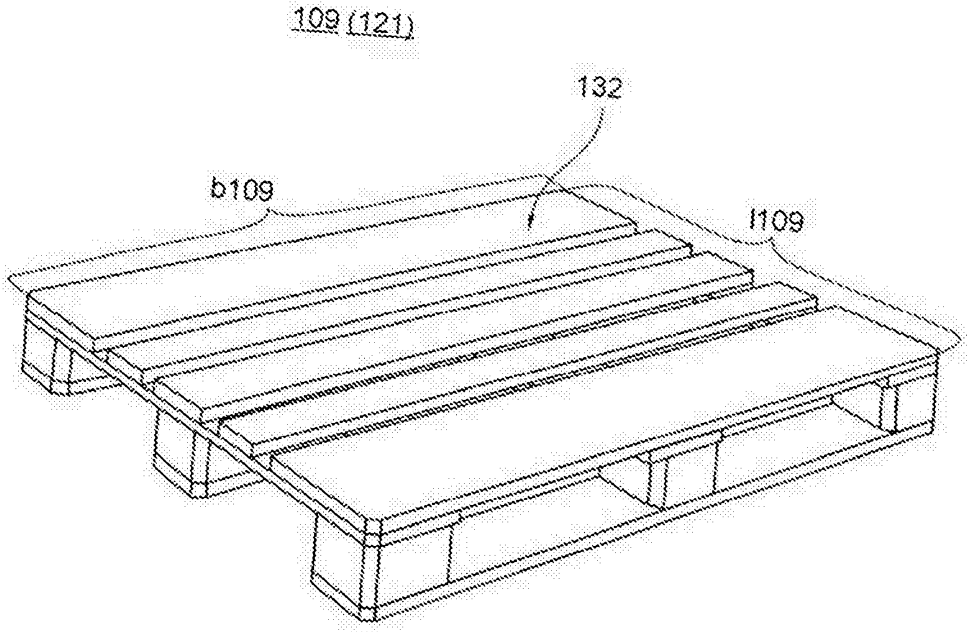

Fig. 7

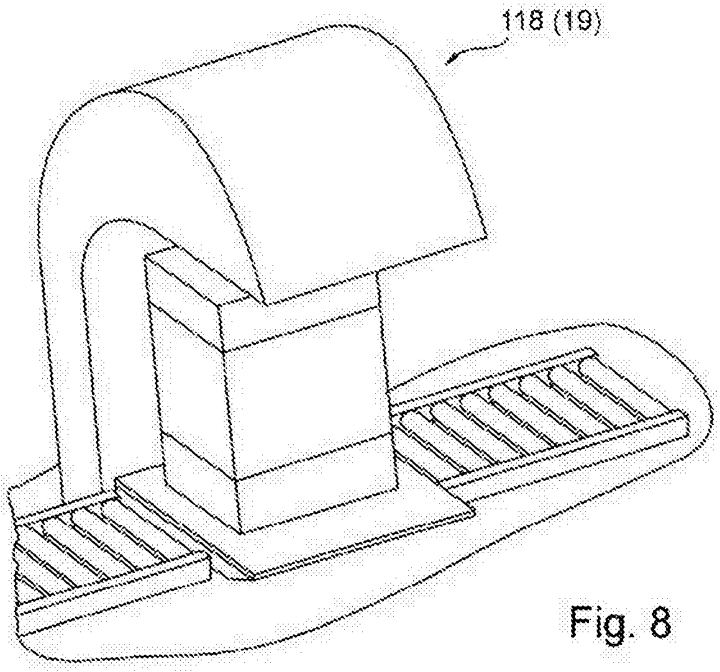

Fig. 8

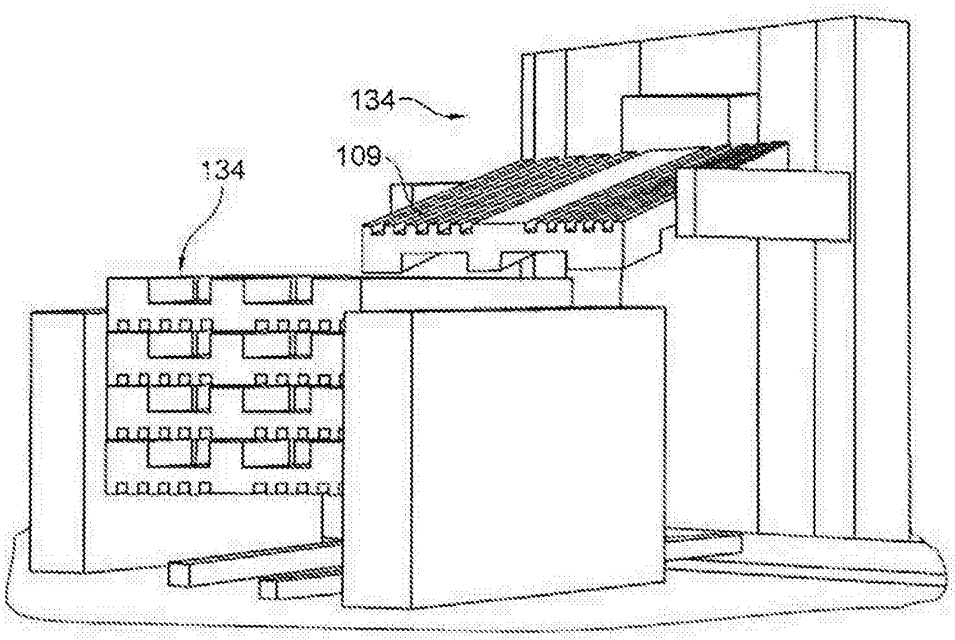

Fig. 9

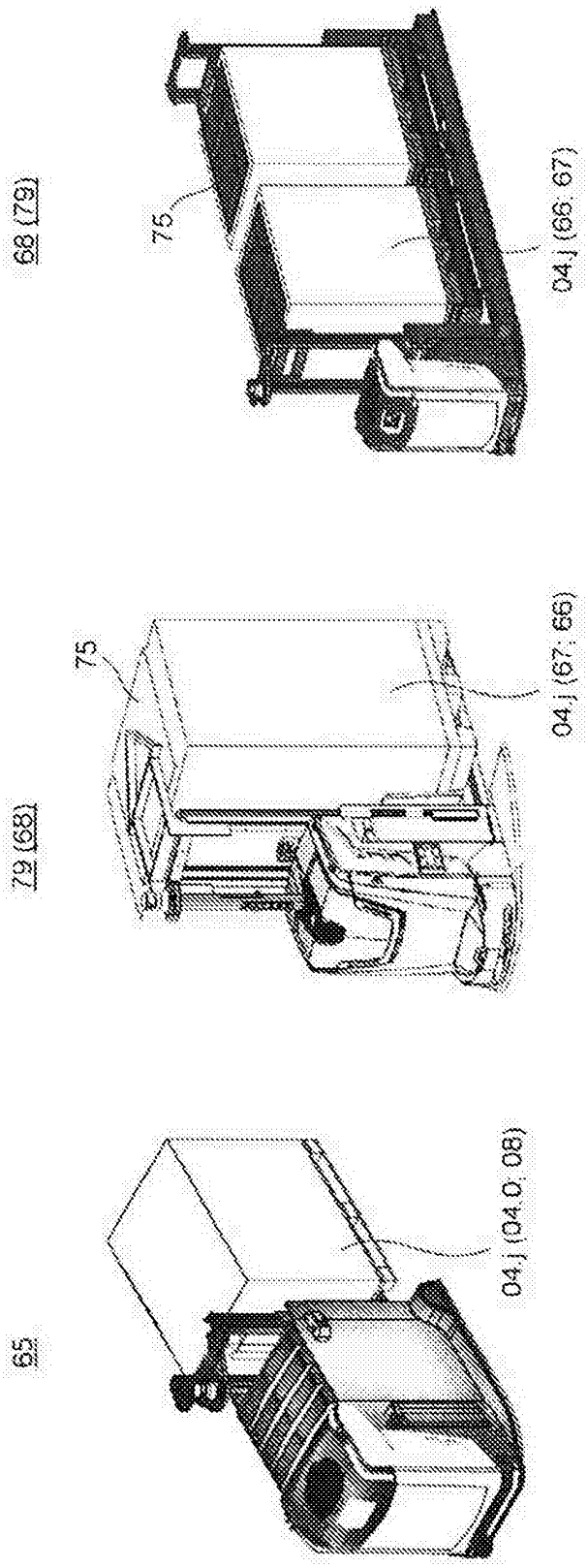

Fig. 10

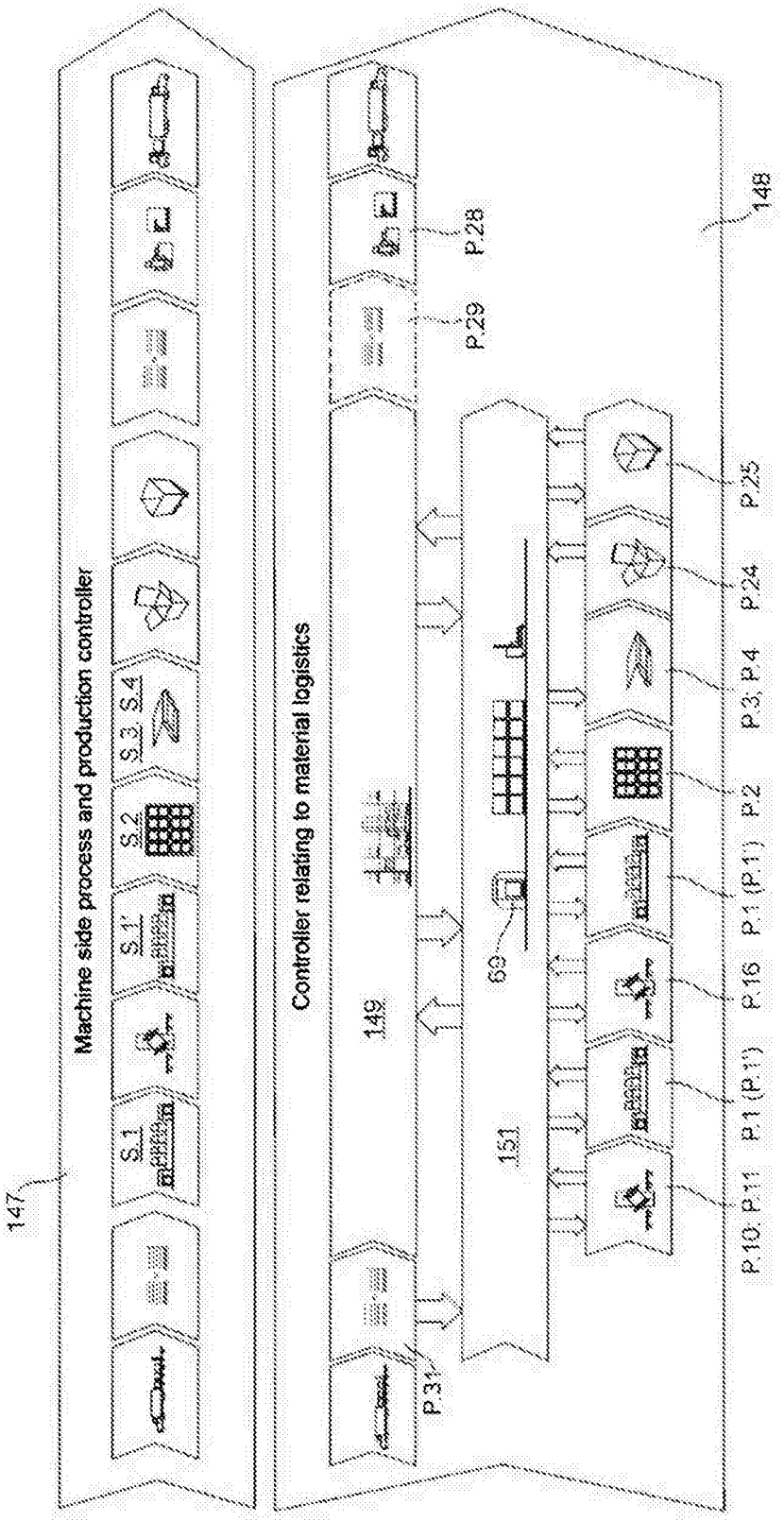
147
Machine side process and production controller
S1
S1'
S2
S3
S4
Controller relating to material logistics
149
151
69
148
P.28
P.29
P.31
P.10, P.11
P.1 (P.1')
P.16
P.1 (P.1')
P.2
P.3, P.4
P.24
P.25

Fig. 11

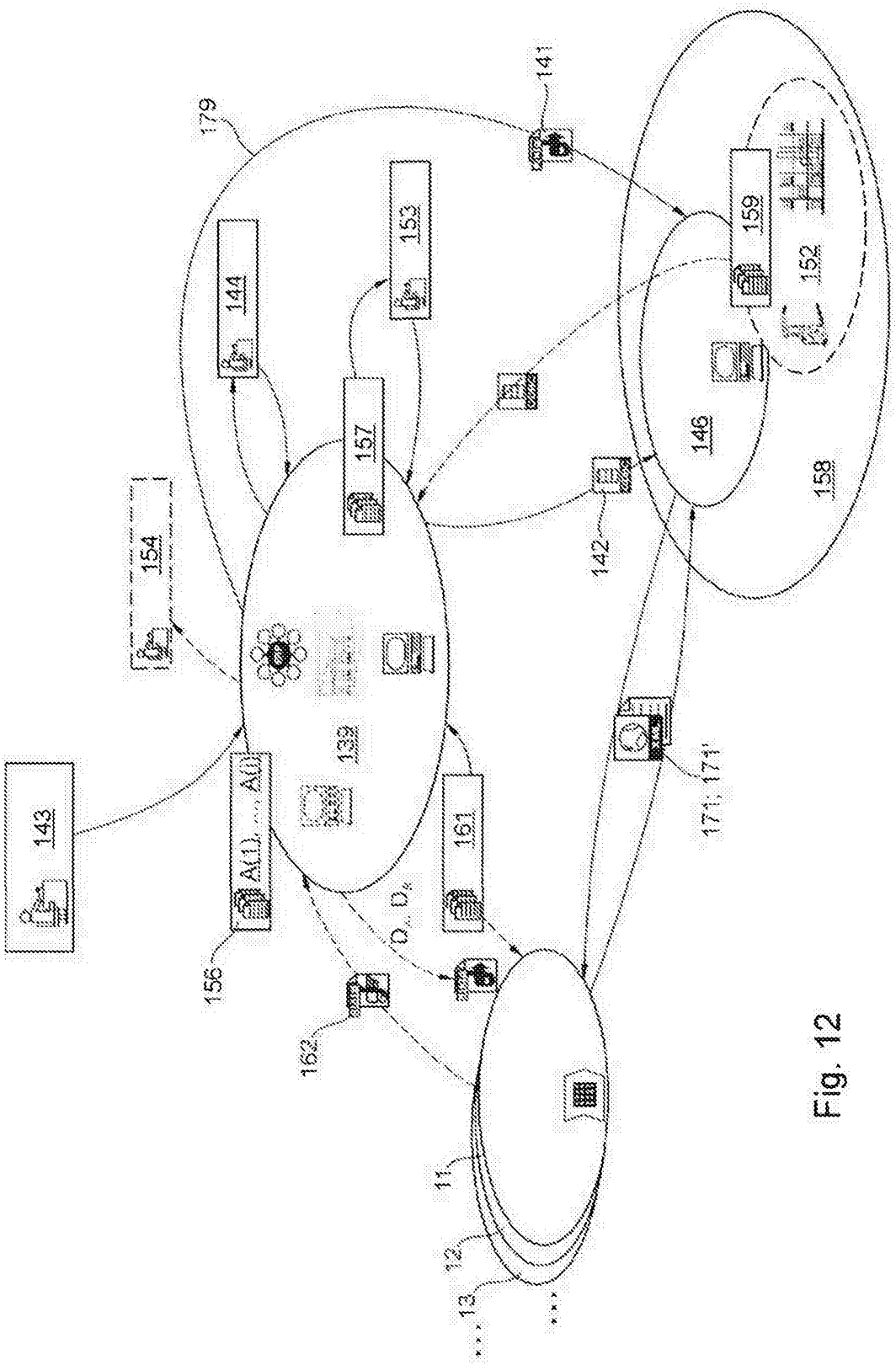
179
141
144
153
159
152
157
146
158
154
142
143
139
A(1,1), ... A(0,1)
161
156
162
171; 171'
11
12
13

Fig. 12

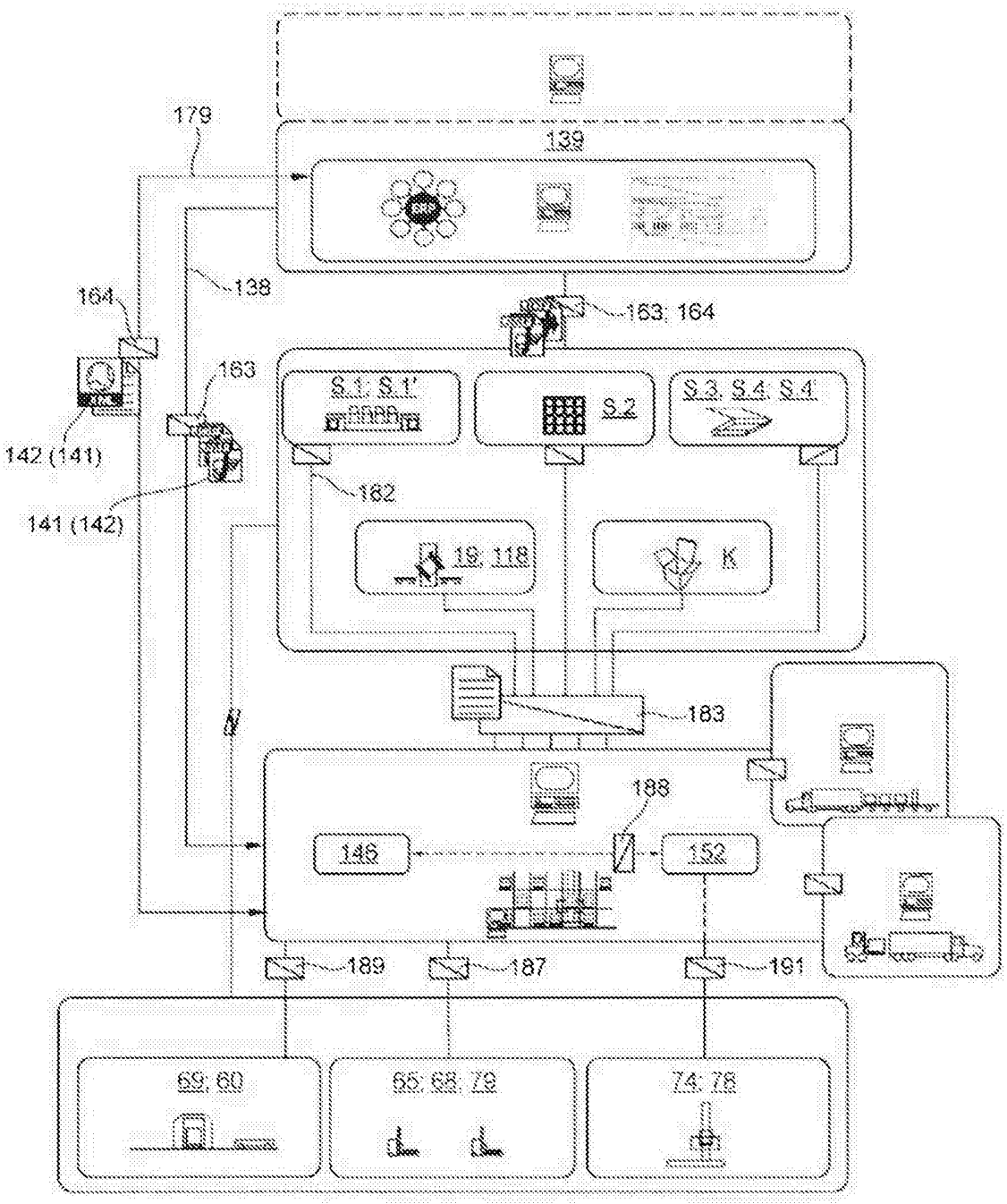
179
139
138
164
163; 164
163
142 (141)
141 (142)
S.1; S.1'
S.2
S.3; S.4; S.4
182
18; 118
K
183
188
146
152
189
187
191
69; 80
65; 68; 79
74; 76

Fig. 13

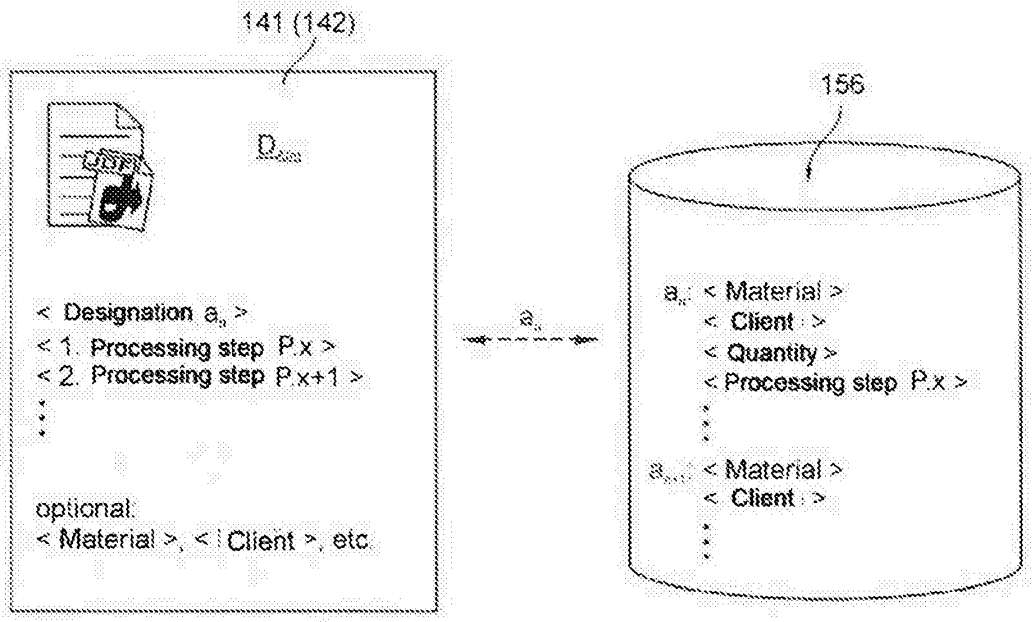
141 (142)
156
< Designation a_n >
< 1. Processing step P.x >
< 2. Processing step P.x+1 >
optional:
< Material >, < Client >, etc.
a_n
a_n: < Material >
< Client >
< Quantity >
< Processing step P.x >
a_{n+1}: < Material >
< Client >

Fig. 14

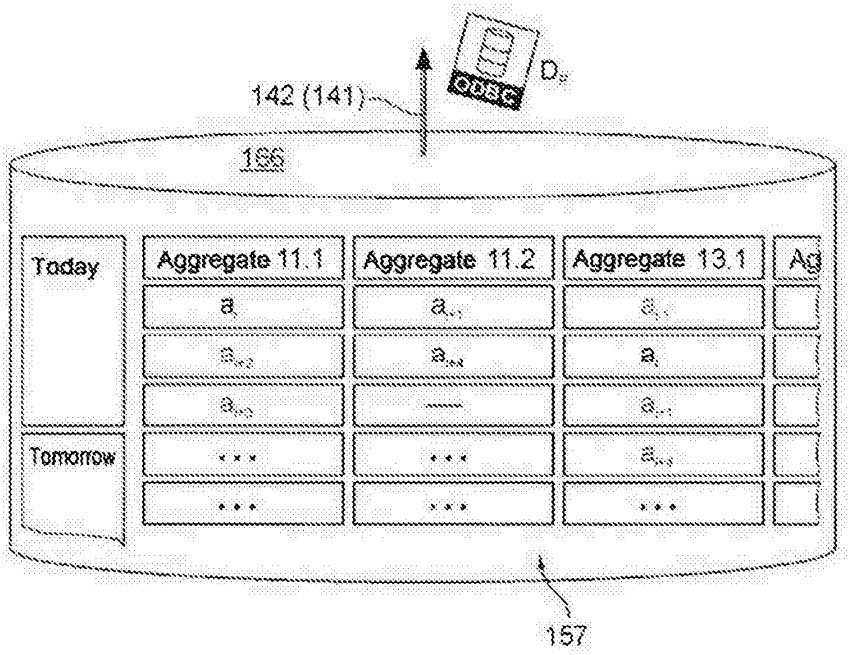
142 (141)
166
Today
Tomorrow
Aggregate 11.1
Aggregate 11.2
Aggregate 13.1
Ag
157

Fig. 15

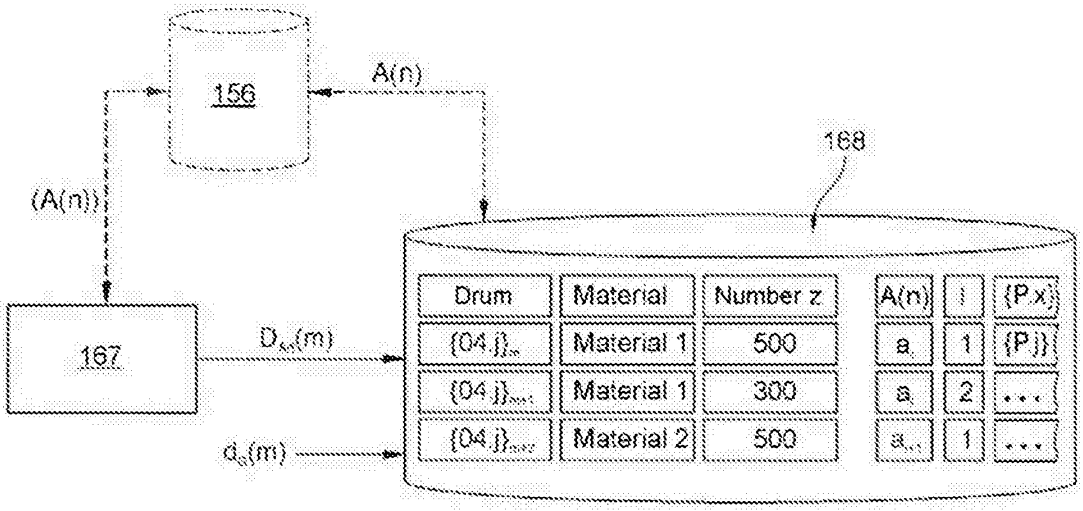
156
A(n)
168
(A(n))
167
$D_{a_n}(m)$
$d_{a_n}(m)$
Drum
Material
Number z
A(n)
i
{P,x}
{04 j}...
Material 1
500
a_n
1
{P,j}
{04 j}...
Material 1
300
a_n
2
...
{04 j}...
Material 2
500
a_{n+1}
1
...

Fig. 16

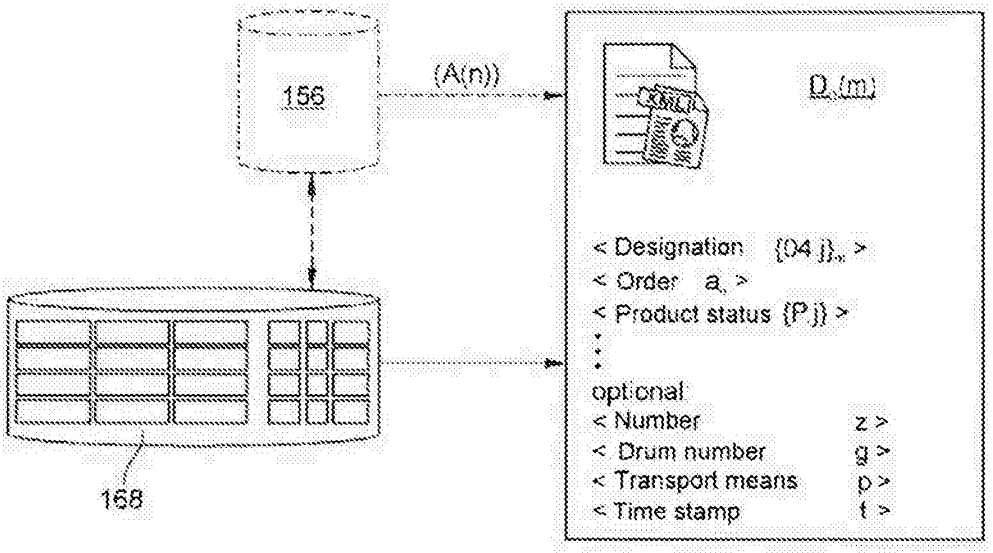
156
(A(n))
$D_{a_n}(m)$
< Designation {04 j}... >
< Order a_n >
< Product status {P,j} >
optional
< Number z >
< Drum number g >
< Transport means p >
< Time stamp t >
168

Fig. 18

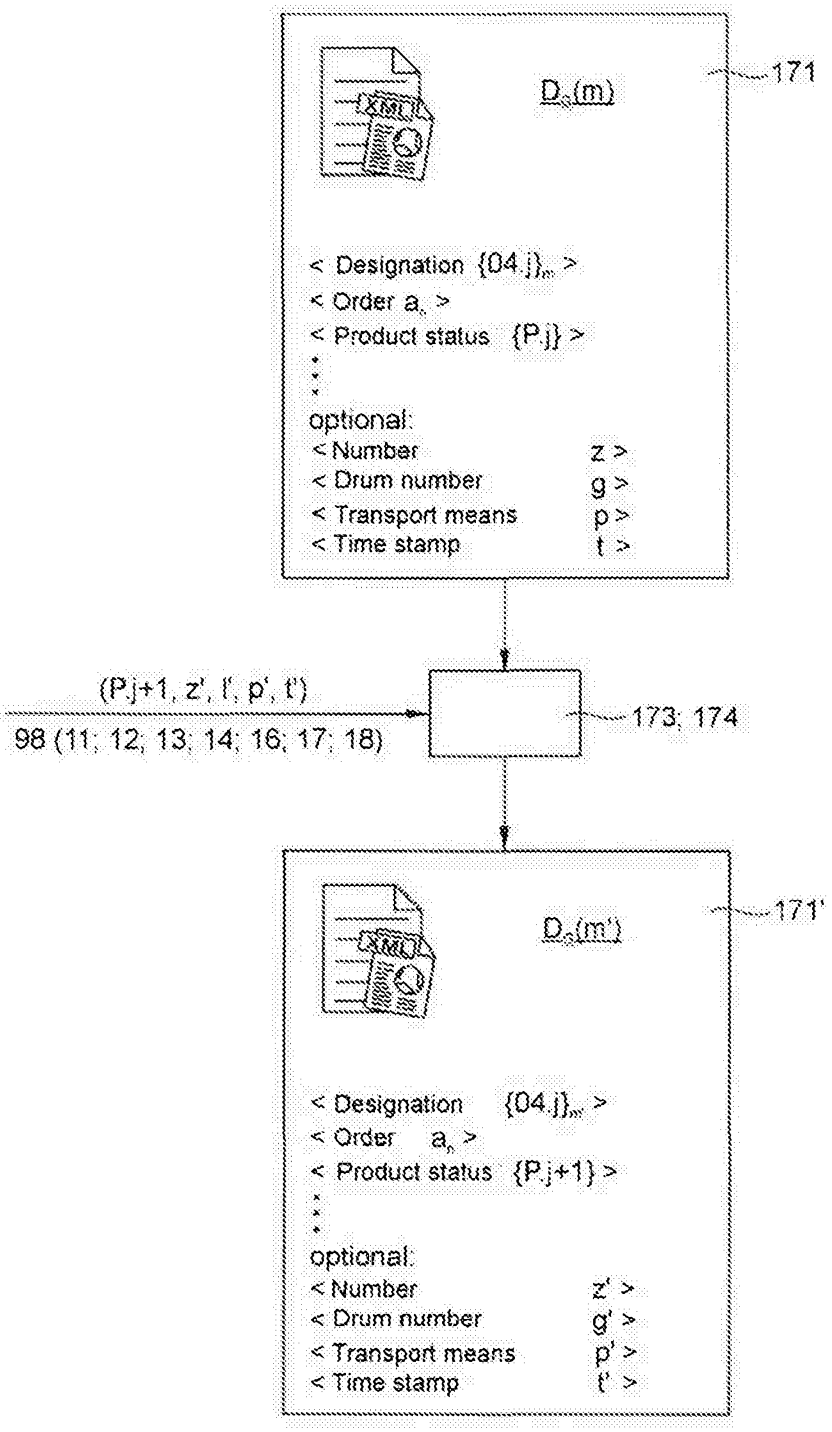
171
$D_n(m)$
< Designation $\{04.j\}_m$ >
< Order a_n >
< Product status $\{P.j\}$ >
optional:
< Number z >
< Drum number g >
< Transport means p >
< Time stamp t >
(P.j+1, z', l', p', t')
98 (11; 12; 13; 14; 16; 17; 18)
173; 174
171'
$D_n(m')$
< Designation $\{04.j\}_m$ >
< Order a_n >
< Product status $\{P.j+1\}$ >
optional:
< Number z' >
< Drum number g' >
< Transport means p' >
< Time stamp t' >

Fig. 17

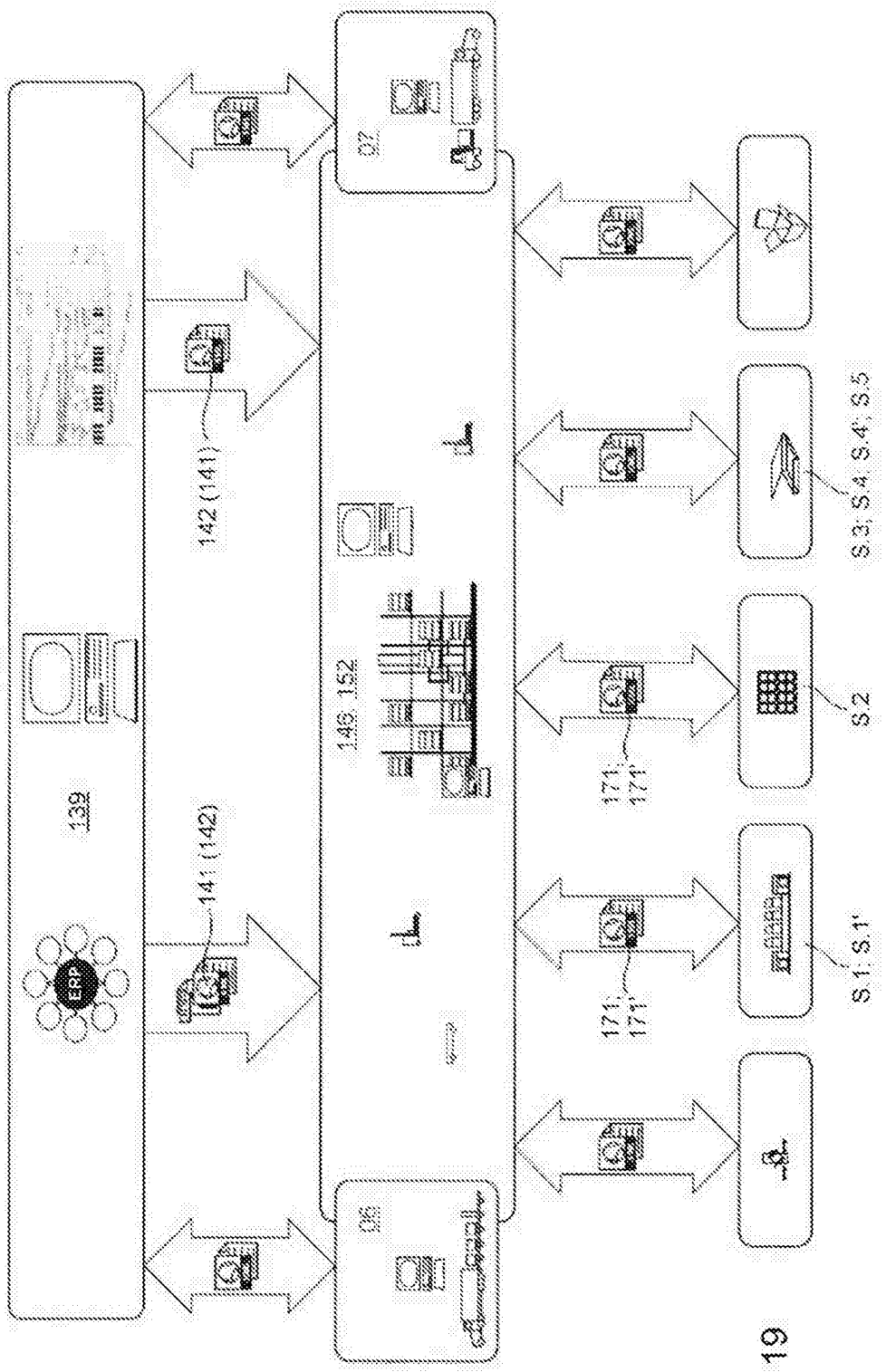

Fig. 19

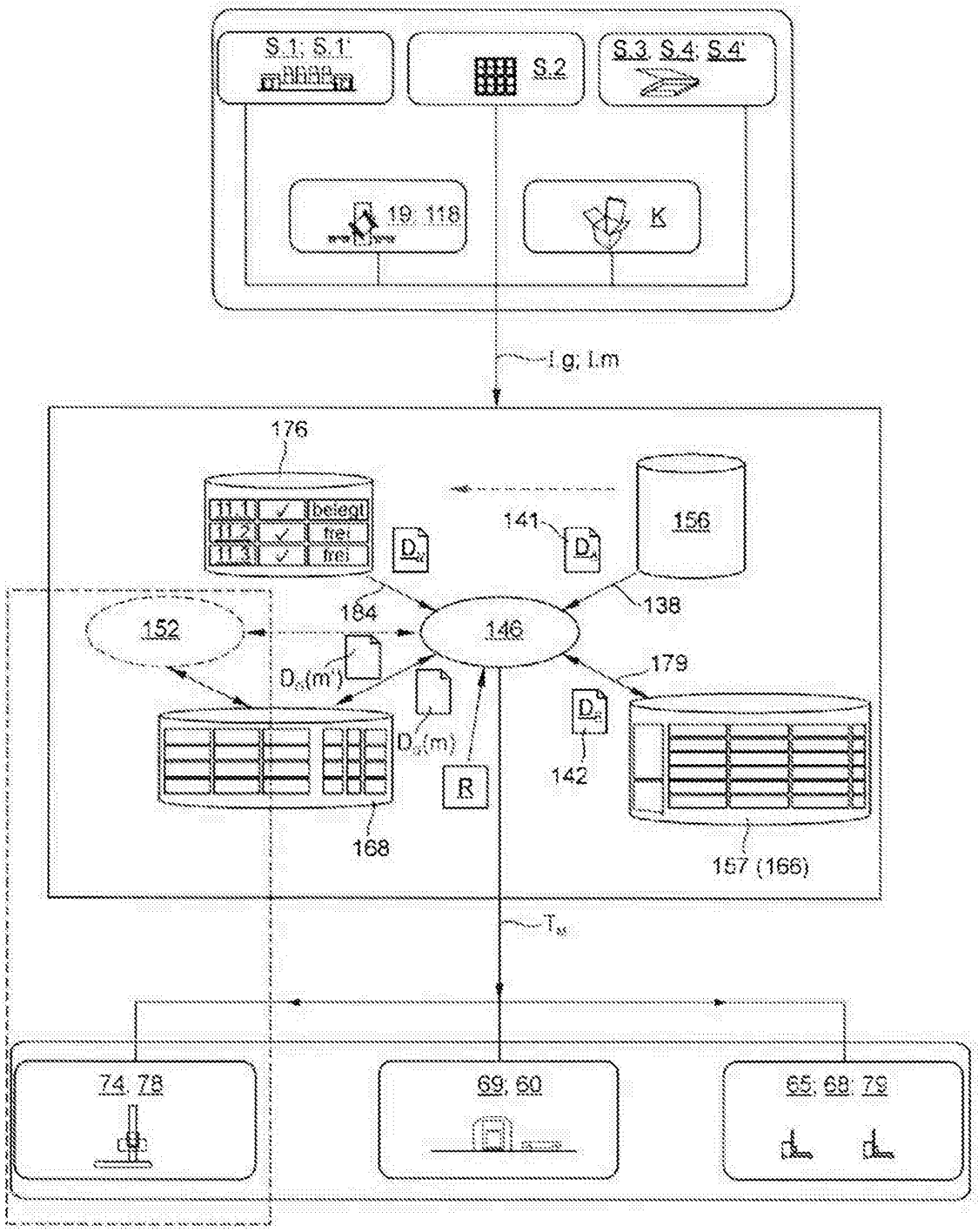
S.1, S.1'
S.2
S.3, S.4, S.4'
19, 118
K
I.g, I.m
176
belegt
frei
frei
141
156
152
184
146
138
179
168
R
142
167 (166)
74, 78
69, 60
65, 68, 79

Fig. 20