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(54) **METHOD FOR EXECUTING A PRINT JOB IN ACCORDANCE WITH A JOB SPECIFICATION**

(57) Method for executing a print job in accordance with a job specification, comprising the steps of: receiving a job specification; changing the job specification by changing at least one first job setting of the job specification; wherein the received job specification comprises an intent; and the method further comprises the steps of: analysing whether the changed job specification complies with the intent in view of the changed, first job setting; if the changed job specification complies, executing the job according to the changed job specification; if the changed job specification does not comply, determining a second job setting to change and a job setting value to change the second job setting to in order to make the thus changed job specification comply with the intent, and executing the job according to the thus changed job specification.

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Dit octrooi is verleend ongeacht het bijgevoegde resultaat van het onderzoek naar de stand van de techniek en schriftelijke opinie. Het octrooischrift komt overeen met de oorspronkelijk ingediende stukken.

METHOD FOR EXECUTING A PRINT JOB IN ACCORDANCE WITH A JOB SPECIFICATION

Field of the Invention

The present invention generally pertains to a method for executing a print job in accordance with a job specification, comprising the steps of: receiving a job specification and changing the job specification by changing at least one first job setting of the job specification. The invention also pertains to a computer program product to execute such a method.

The invention also pertains generally to a printer controller for managing a print job specified by a job specification and controlling a print engine to print the print job in accordance with the job specification, the controller comprising: a communication device arranged for receiving the print job; and wherein the managing of the print job comprises changing a job specification for the received print job by changing a job setting of the job specification. The invention further pertains to a print system comprising such a printer controller.

Background Art

In production printing print jobs are typically prepared during a pre-processing phase. During pre-processing, several activities are performed to define the printed product (for example a book). These activities might include for example gathering of digital files defining the content to be included in the printed product such as a file defining the book cover and another file defining the book block. Further activities might be selecting a signature for the printing of the book block and a corresponding impositioning for each page taking into account differing left, right, top, and bottom margins, binding gutters, creep correction, etc. Furthermore, these activities might include pre-flighting and soft-proofing to validate whether specification can be processed without errors or conflicts and whether the result is as expected.

All settings defined during pre-processing are typically recorded in a job ticket (for example according to the JDF (job Definition Format) standard) although it is also possible to record them (or some of them) in the print data itself. In the remainder of this writing, we will refer to the job ticket, even if some or all of the settings are recorded in the print data. Furthermore, the settings in the job ticket are not necessarily limited to

print settings. The settings may relate to every step in the production process, for example, it is customary that settings related to finishing, such as trimming and binding, are also recorded in the job ticket.

A disadvantage of the known pre-processing, printing, and post-processing (for example finishing) systems is that sometimes decisions are taken during pre-processing that cannot be executed during printing or post-processing for various reasons. An example is that during pre-processing media are specified with certain media properties including a certain size (for example A4) and a certain weight (for example 250 g/m²). The media properties are recorded in the job ticket or in the print data themselves. Then during printing the printer operator may determine that there is insufficient stock of the exact media type as specified. However, it may still be possible to execute the customer order by changing the print job appropriately. Some simple changes may be done on the printer itself by changing a single job settings. Other slightly more complex changes might still be done on the printer by changing multiple job settings, because a single job setting might not suffice due to “side effects” of the change that need to be cancelled out. However, it is also common that the print job has to be changed in pre-processing and resubmitted to the printer.

The objective of the present invention is to make it easier to deal with changing job settings after the pre-processing phase.

Summary of the Invention

In a first aspect of the present invention, a method is provided for executing a print job in accordance with a job specification, comprising the steps of: receiving a job specification; changing the job specification by changing at least one first job setting of the job specification; wherein the received job specification comprises an intent; and the method further comprises the steps of: analysing whether the changed job specification complies with the intent in view of the changed, first job setting; if the changed job specification complies, executing the job according to the changed job specification; if the changed job specification does not comply, determining a second job setting to change and a job setting value to change the second job setting to in order to make the thus changed job specification comply with the intent, and executing the job according to the thus changed job specification.

In contrast to prior art solutions, the intent in the job specification does not merely specify what operations to perform and what settings to apply during the execution of the job, but directly specifies the actual, intended result. So whereas the typical job specification uses an *imperative* approach, the intent adds a *declarative* aspect. As an example, instead of specifying to print on a sheet of RA4-sized media and trimming of 2.5 mm from all four edges, the intent will only specify that the end product should be A4-sized. Note that a job setting and a job intent may have an identical value, but have a different meaning. If the job setting specifies to print a single page on A4-sized media and also specifies an intent of producing an A4-sized sheet, the job setting and the job intent will appear to convey the same information. However, they mean different things. The job setting to print on A4-sized media will only *result* in producing A4-sized sheets (as the job intent specifies) in the absence of cutting, trimming, and folding actions. For example, the job settings may specify printing on A3-sized media and subsequently folding the sheets. The result is an A4-sized booklet though. Therefore, the intent should specify an A4-sized booklet. The real advantage of the intent is that it allows for alternative production methods, for example printing A4-sized media and glue-binding them into an A4-size booklet.

The job specification may be comprised in the actual print data, however as it is more customary in the production printing industry to specify jobs in a ticket, for example a ticket according to the JDF standard, inhere most examples will actually show job specifications in the form of tickets. It is however, also possible that the job is partly specified in the print data itself and partly in the ticket.

The print job is not necessarily received at a printer. It may as well be received at a print server or a management system for print jobs or print orders (MIS).

The job setting may be changed automatically (for example in an automation workflow) or manually (for example by an operator making adjustments to the job specification such as selecting different media size). The operator may change the job setting from a user interface of the printer, but also from a workstation that allows an operator to manage print jobs.

In a further aspect according to the present invention a method is provided wherein the step of changing the job specification by changing at least one first job setting of the job specification comprises changing at least one first job setting upon receiving an operator command to that end.

In again a further aspect of the invention a method is provided for specifying a print job comprising print data, the specification method comprising the steps of: specifying job settings for the print job; recording the job settings in at least one of: the print data of the print job, and a job ticket for the print job; specifying an intent; and recording the intent in at least one of: the print data of the print job, and a job ticket for the print job. This aspect focusses on specifying the print job in order to have it executed in accordance with any of the aspects relating to the execution of the job.

In a further aspect of the invention a method is provided, wherein the intent represents at least one of: a direct specification of a required property of the resulting final print product, and an optimisation target which target is to be maximised or minimised during execution of the print job.

If more than one optimisation intent is provided, they may optionally be provided with a priority or a weight. This allows to provide a preference for a certain optimisation if some of the optimisation intents may contradict each other. For example, minimising trimming waste may increase the number of finishing operations to perform to obtain the final intended product. In such a case, a preference may be expressed to balance minimising trimming waste and time spent on finishing operations.

According to a particular aspect of the present invention, a method is provided, wherein an intent specifies at least one of: a direct specification of the intended size of a sheet of the final product to be produced with the print job, creep compensation to be applied, an integral shift to be applied, a trimming shift or alignment, an automatic bleed spacing, and a format of the print product such as a booklet or a flip-over.

According to another particular aspect of the present invention, a method is provided, wherein an intent specifies at least one of: a maximum same-up print specification to specify to maximise the number of pages to print on a sheet with same-up printing, a maximise page count signature, a minimise white page specification, a minimise waste specification, a minimise number of post-processing operations specification, and a minimise number of post-processing devices specification.

As an illustrative example: creep compensation is normally applied during pre-processing in an impositioning step. This results in a print job specifying for the text block of each page to be individually shifted (or actually positioned) in order to compensate for all the text blocks being displaced with respect to each other during

folding actions allowing for the text blocks to line up again in the final product. In the prior art, a printer operator shouldn't select a different media weight from the weight specified (directly or indirectly) during pre-processing otherwise the text blocks of the pages will not line up any more. According to the invention, the intent "creep compensation" is specified. When the printer operator selects media with a different media weight, the printer is able to recalculate the impositioning and reapply creep compensation during the impositioning (probably in combination with an intent for a text block position in the final product instead of the traditional position with respect to the media size during printing).

In a further aspect of the invention a computer program product is provided that is embodied on a non-transitory computer readable medium that, if executed on a processor, performs the steps of any of the above methods.

In one embodiment, the present invention provides a printer controller for managing a print job specified by a job specification and controlling a print engine to print the print job in accordance with the job specification, the controller comprising: a communication device arranged for receiving the print job; wherein the managing of the print job comprises changing a job specification for the received print job by changing a job setting of the job specification; wherein the controller is further arranged to read an intent from the job specification and determining whether the job specification complies with the read intent after a job specification has been changed; and if the changed job specification complies, executing the job according to the changed job specification; if the changed job specification does not comply, determining a second job setting to change and a job setting value to change the second job setting to in order to make the thus changed job specification comply with the intent, and executing the job according to the thus changed job specification.

In a further embodiment, the present invention provides a printer controller further comprising a user interface and wherein the user interface is arranged to display a screen to allow a user to change the job specification by changing at least one first job setting of the job specification.

In a particular embodiment, the present invention provides a printer controller, wherein the intent represents at least one of: a direct specification of a required property of the resulting final print product, and an optimisation target which target is to be maximised or minimised during execution of the print job.

In another particular embodiment, the invention provides a print system comprising: at least one print engine for providing print media with marking material in accordance with a print job, and a printer controller according to any of the previous embodiments.

In a further embodiment, the present invention provides a print system further comprising at least one finisher for performing finishing operations in accordance with the print job on the printed media printed by the at least one print engine.

Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating embodiments of the invention, are given by way of illustration only, since various changes and modifications within the scope of the invention will become apparent to those skilled in the art from this detailed description.

Brief Description of the Drawings

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying schematical drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

Fig. 1 shows a diagram with a production workflow to which the present invention may be advantageously applied.

Fig. 2 shows a block diagram of a printing system suitable for implementing the present invention in.

Fig. 3 shows schematically a exemplary product to be produced in accordance with the invention.

Fig. 4 shows schematically the exemplary product from Fig. 3 and how it is specified to be produced in the workflow of Fig. 1.

Fig. 5 shows a simplified representation of a job ticket in accordance with the prior art.

Fig. 6 shows the simplified job ticket of Fig. 5 enhanced in accordance with the present invention.

Fig. 7 shows an intermediate stage of the exemplary product from Fig. 3 due to practising the present invention.

Fig. 8 shows a flow diagram of a method in accordance with the present invention.

Detailed Description of the Drawings

The present invention will now be described with reference to the accompanying drawings, wherein the same reference numerals have been used to identify the same or similar elements throughout the several views.

A typical production workflow (Fig. 1) comprises one or more pre-processing steps 110 such as page programming, impositioning, pre-flighting, soft proofing, etc. Such pre-processing steps 110 are typically done on stand-alone workstations 112. After pre-processing 110 is complete, a job is created that is submitted 115 to a printer 122 or a print server (not shown). In the printer 122 the printing process 120 takes place. The printing process 120 may take place on a single printer 122 or on multiple printers. For example, the print job may be distributed over multiple printers to print in parallel. Or different parts of the print job may be executed on different printers depending on the printer capabilities required to produce those parts. For example, a black-and-white book may be printed on a black-and-white printer, but the book cover may comprise a colour design and may be printed on a colour printer. After the printing steps 120, post-processing 130 takes place. Post-processing 130 comprises finishing operations such as stacking, cutting, trimming, binding, laminating, etc. Some finishing steps may be performed by the printer 122 if it comprises inline finishing devices. A typical inline finisher is a stapler that can staple a (relatively small) stack of sheets together. However, more involved finishing steps are typically executed on a nearline or offline finisher 132. Finisher 132 may for example be a booklet maker that folds a stack of sheets and binds the sheets at the fold to create a booklet.

A typical reprographic apparatus (Fig. 2) such as a printer 122 generally comprises a controller 210 and an engine 220.

The engine 220 is responsible for low-level control of the apparatus. It deals with individual hardware components that are responsible for the reprographic process such as drives for media transport, media detectors (in the media path as well as in the input and output media trays), path switches, fusers, print heads, etc.; in general actuators and sensors 228. These actuators and sensors are connected through input/output (I/O) boards 227 to a bus 229. The bus 229 connects the major components in the engine 220. Actual data processing takes place in a central processing unit (CPU) 221.

The CPU 221 reads sensor values from the sensors 228 through the I/O 227. Based on these sensor values and other data such as print data and print commands received from the controller 210, the CPU 221 determines how the engine 220 should respond to this information and determines appropriate actuation values that are sent through the I/O 227 to the actuators 228. The engine 220 comprises a volatile memory such as a random access memory (RAM) 222 to temporarily store data for processing such as the print data and print commands received from the controller 210, and the sensor values read from the sensors 228. Furthermore, a non-volatile memory such as a hard disk drive (HDD) 223 serves to store data in a more permanent manner, for example to survive a power down of the system. This hard disk drive 223 typically also stores embedded software comprising computer instructions that are run on the CPU 221. The engine 220 typically runs a real-time Operating System (RTOS), for example a soft real-time Operating System in order to deal with the time critical functions of controlling the actuators 228. The engine 220 further comprises a communication device 224 to communicate with the controller 210. Typically, the engine 220 receives print data and print commands from the controller 210 and provides back status information on the engine 220 itself and on the processing of the print commands and print data, including sending error messages to the controller 210.

The controller 210 is connected to the engine 220 through a communication device 214 that communicates with the communication device 224 of the engine 220. These communication devices 214, 224 may be implemented as Ethernet network interface controllers (NIC). Processing in the controller 210 is done by a CPU 211 that is connected to all the other components in the controller 210 through a bus 219. The data to be processed is temporarily stored in a volatile memory such as RAM 212, while data is stored in a more permanent manner in a non-volatile memory such as hard disk drive 213, for example in order to survive power downs, but also to relieve the volatile memory 212 which typically has a smaller storage size. The hard disk drive 213 typically stores print jobs, each comprising print data and a job ticket. Furthermore, the hard disk drive 213 comprises converted print data which is print data converted to a format suitable for processing by the engine 220. Typically the converted print data comprises raster images. Converting the print data in the print jobs to converted print data is typically done in a Raster Image Processor (RIP). Although the RIP may be a dedicated hardware device, it is common to be implemented in software and running on CPU 211. As the RIP-process is rather computationally intensive, it is common for controllers 210

to have multiple processing units in the form of a multi-core CPU 211 or multiple CPUs 211. The controller 210 further comprises a display 216 to show messages to an operator, or display a complete graphical user interface (GUI) to an operator for operating the reprographic apparatus. The display 216 is supplemented by a human interface device (HID) 218 such as a keyboard, mouse, touchpad, stylus, or touch sensitive panel integrated into display 216, and allows the operator to operate the reprographic apparatus. The controller 210 comprises a communication interface 217 for communicating with peripheral devices such as finishers, for example, stackers, staplers, binders, punchers, cutters, trimmers, folders, media input units, etc. The controller 210 further comprises a network interface card (NIC) 215 to connect the controller 210 to a computer network. Through the network connection, print jobs may be submitted to the controller 210 and the results of scan jobs may be retrieved from the controller 210. For these operations the controller 210 may be directly in communication with individual workstations, or indirectly through a print server. Furthermore, the network connection may be used to remotely operate the reprographic apparatus, monitor its status, and send production data to monitoring systems, accounting systems, or business information systems. Note that in smaller printer models, specifically printers suitable for placement on desks, it is common to use communication interfaces such as USB, FireWire, or Bluetooth instead of the NIC 215.

The controller 210 and the engine 220 may be implemented in a single printer device (typical for smaller printers for low volume printing), or as two separate, but interconnected devices (typical for larger, high-volume production printers).

The engine 220 typically deals with print data on a sheet level, swath level, or even line level. The engine 220 is typically not aware of information on a document or even job level. In contrast the controller 210 typically receives print jobs comprising one or more documents, the documents typically comprising multiple pages.

In Fig. 3 an exemplary document is shown as might be ordered by a customer. The document describes a single page 310 with a header background 312 and a footer background 314 as well as some text elements 318 making up the main part of the document. The header background 312 and footer background 314 are to be printed with a background colour or image that is to printed full bleed (extending to the sheet edge without any margin between the background colour or image and the sheet edge). The customer has ordered the document to be printed single sided (simplex) on A4

sized media with 300 g/m² media weight (thickness) the media being single side (top side) coated.

As many printers either cannot print full bleed, or require cleaning after printing full bleed due to ink or toner being present on the media edges, such an customer order is typically produced by printing on slightly bigger media with a small margin between the media edge and the intended page border (the trimbox) with the backgrounds “bleeding” into the margin. After printing, the edges of the media sheets are trimmed (according to the defined trimbox). This cuts of the margins with the small edge of the background that “bleeds into” the margin resulting in full bleed backgrounds.

To produce this document, during pre-processing 110 the job may be specified as follows (Fig. 4). For the single page 310 in the document a media type with size RA4 (215 mm × 305 mm) is specified. If the header and footer backgrounds 312, 314 were not already defined by the customer to extend beyond the original A4-sized page’s borders, they are extended during pre-processing to make them “bleed into” the margin 422. The remaining part of the margin 422 extending to the media edge remains blank to prevent ink or toner contamination in the printer 122.

A trimbox is defined (not shown although it is common to also print visual trim marks to facilitate manual trimming) to define how much of each edge of the media should be trimmed off after printing to obtain the A4 size the customer ordered with the full bleed.

The other media properties are defined such as the media weight 300 g/m² and single side coated (C1S). Simplex printing is selected. All these settings are stored as job settings in a job specification. The job specification may be embedded into the print data to be submitted 115 to the printer 122, but in production printing it is typically recorded in a job ticket, for example according to the JDF standard. It is also possible to embed some job settings in the print date, while other job settings are recorded in the job ticket.

After pre-processing 110 is finished a job ticket 500 (Fig. 5) is generated and sent to the printer 122 with the print data. The job ticket 500 comprises the typical job settings 530 comprising of job setting names 510 with their corresponding values 520. Note that the job ticket shown in Fig. 5 is simplified to facilitate understanding. For example, JDF tickets are XML documents specifying many more job settings structured in a much more complex structure than actually shown.

Once the print job (including the job ticket 500) is submitted 115 to the printer 122, the printer operator will at some point be ready to prepare for printing the print job. One of the tasks of the printer operator is to make sure sufficient media of the correct type are loaded. However, the printer operator concludes that there is not sufficient stock of RA4-sized, 300 g/m², single-side coated media to print the entire print job. Instead, the printer operator decides to print the print job on B3-sized (353 × 500 mm), 300 g/m², single-side coated media.

According the prior art, the operator could change the media size to B3, but depending on the equipment available in the print shop, this might not be sufficient. For example, the trimmer might not be able to trim the biggest margin off requiring an alternative approach to the trimming. Furthermore, trimming more than half the media off is wasting a lot of media, so the printer operator might consider printing 2-up. If the printer 122 natively supports 2-up printing, due to limitations in the printer 122 or the printer's user interface, this may either be complex to properly configure through the printer's user interface or it may only be possible with reduced functionality requiring more manual operations later. It is not uncommon that the printer operator will actually sent the job back to pre-processing to have it set up for the alternative B3 media size.

Now, according to the invention, during pre-processing 110, the job ticket 600 (Fig. 6) not only comprises the job settings 530, but also a job intent 640. The job intent 640 differs from the job settings 530 in that it only specifies an intention whereas the job settings 530 define the "how" of the job, namely specific settings to be applied directly to individual steps to be performed. In contrast, the intent 640 only defines a certain result (a property of the final end product) or an optimisation to apply during execution of the job. Particularly, it defines in this case that the end product should finally have a media size A4 (after printing and post-processing). It doesn't necessarily specify the media size used during printing (although that could sometimes be a valid way to obtain that result although not in the full bleed example provided here). The job settings 530 specify what media size the printer 122 is to select during printing, namely media with size RA4 (and weight 300 g/m² and coating C1S).

Now that the ticket 600 defines both the settings 530 to apply during the production steps as well as the intent 640, it allows for the operator to change one or more job settings 530 and have the print system automatically adjust in order to ensure that the customer actually gets what he wanted.

As the printer 122 has received the ticket 600 comprising the intent 640, the printer operator can change the media size setting from RA4 to B3. The printer 122 detects that the ticket 600 comprises an intent 640 and will check whether the job specification with the changed media size complies with the intent 640. It will also check the optimisation intent that specifies that "max same-up" should be applied, meaning that if there is sufficient space on the media selected for printing on, the printer should apply a same-up setting that maximises the number of (identical) pages on the media sheet. In this case, the printer 122 notices that the B3-sized sheet can accomodate two pages (with sufficient margin for the bleeding and for cutting and trimming). So due to the "max same-up" optimisation intent, the printer 122 will automatically switch to 2-up printing for same-up printing (Fig. 7). Furthermore, due to the media size intent, the printer 122 will also define the correct cutting and trimming settings in order to have the two pages on the single B3 sheet cut down to two A4-sized sheets in accordance with the original trimbox (as originally defined for the RA4-sized media).

This way, the printer operator only has to tell the printer 122 that he is not going to print on RA4 media, but on B3 media instead, and the printer 122 can automatically adjust to still produce what the customer actually ordered (A4-sized pages) and do it in an efficient way (using same-up printing to reduce on wasted media).

In order for the printer 122 to determine a changed impositioning (instead of a location of the page image on the RA4-sized sheet, two locations of the same page image on a B3-sized sheet), the printer 122 needs to have access to an impositioning algorithm, either internally or externally. Typically, modern production printers do have such access. In general, whether a printer 122 is able to automatically validate every single intent and if necessary change the job specification in order to bring the job specification back into compliance with every single intent depends on the capabilities of the printer 122 and the resources it has available. For example, if an intent requiring creep compensation is present, the printer 122 needs to know directly or indirectly the thickness of the media used (which modern production printers typically do). In the ideal situation the printer 122 has access to the same information and algorithms as the pre-processing 110 steps have.

Note that the operator may not only change from RA4 to B3 media for reasons of insufficient RA4 stock, but also because it may be more productive to print two pages on B3 sheet in one pass instead of printing two pages on two separate RA4 sheets

(although this may be partly offset by increased post-processing operations due to more, or more complex trimming and cutting).

This procedure of executing the job according to the invention is shown in the form of a flow diagram in Fig. 8. The procedure starts 802 and receives 804 a job. Next, some job setting in the received job is changed 806. The print system reads 808 the intent 640 from the job and verifies 810 the changed job against this intent. If it finds 812 that the job does not comply with the intent, it changes or adds 814 further job settings in order to make the job comply with the intent. For example, in the previous example, the same-up setting was set to 2-up printing to make the job comply with the "max same-up" optimisation intent, and the cut and trim settings were adjusted to make the job comply with the media size intent of "A4". Once the job is compliant with the job intent, the job is further executed 816 and the procedure according the invention ends 818.

In order to be able to verify the compliance of a changed job with an intent, the job specification should be provided with the intent 640. A convenient way to do this is to add the intent 640 to the job specification when the job specification is created during pre-processing 110. This would also allow to copy input from an order specification or an order intake form straight to an intent 640 or to derive it therefrom.

Detailed embodiments of the present invention are disclosed herein; however, it is to be understood that the disclosed embodiments are merely exemplary of the invention, which can be embodied in various forms. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present invention in virtually any appropriately detailed structure. In particular, features presented and described in separate dependent claims may be applied in combination and any advantageous combination of such claims are herewith disclosed.

Further, the terms and phrases used herein are not intended to be limiting; but rather, to provide an understandable description of the invention. The terms "a" or "an", as used herein, are defined as one or more than one. The term plurality, as used herein, is defined as two or more than two. The term another, as used herein, is defined as at least a second or more. The terms including and/or as used herein, are defined as comprising (i.e., open language). The term coupled, as used herein, is defined as connected, although not necessarily directly.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

Embodiments

1. Method for executing a print job in accordance with a job specification, comprising the steps of:
   - receiving a job specification;
   - changing the job specification by changing at least one first job setting of the job specification;

   wherein the received job specification comprises an intent; and
   the method further comprises the steps of:
   - analysing whether the changed job specification complies with the intent in view of the changed, first job setting;
   - if the changed job specification complies, executing the job according to the changed job specification;
   - if the changed job specification does not comply, determining a second job setting to change and a job setting value to change the second job setting to in order to make the thus changed job specification comply with the intent, and executing the job according to the thus changed job specification.

2. Method according to claim 1 wherein the step of changing the job specification by changing at least one first job setting of the job specification comprises changing at least one first job setting upon receiving an operator command to that end.

3. Method for specifying a print job comprising print data, the print job to be executed by any of the methods according to claim 1 or 2, the specification method comprising the steps of:
   - specifying job settings for the print job;
   - recording the job settings in at least one of:
     - the print data of the print job, and

- a job ticket for the print job;

– specifying an intent; and

– recording the intent in at least one of:

- the print data of the print job, and
- a job ticket for the print job.

4. Method according to claim 1, 2, or 3, wherein the intent represents at least one of:

– a direct specification of a required property of the resulting final print product, and

– an optimisation target which target is to be maximised or minimised during execution of the print job.

5. Method according to any of the preceding claims, wherein an intent specifies at least one of:

– a direct specification of the intended size of a sheet of the final product to be produced with the print job,

– creep compensation to be applied,

– an integral shift to be applied,

– a trimming shift or alignment,

– an automatic bleed spacing, and

– a format of the print product such as a booklet or a flip-over.

6. Method according to any of the preceding claims, wherein an intent specifies at least one of:

– a maximum same-up print specification to specify to maximise the number of pages to print on a sheet with same-up printing,

– a maximise page count signature,

– a minimise white page specification,

– a minimise waste specification,

– a minimise number of post-processing operations specification, and

– a minimise number of post-processing devices specification.

7. A computer program product embodied on a non-transitory computer readable medium that, if executed on a processor, performs the steps of the method of any of the preceding claims.

8. A printer controller for managing a print job specified by a job specification and controlling a print engine to print the print job in accordance with the job specification, the controller comprising:
   - a communication device arranged for receiving the print job;

   wherein the managing of the print job comprises changing a job specification for the received print job by changing a job setting of the job specification;
   wherein the controller is further arranged to read an intent from the job specification and determining whether the job specification complies with the read intent after a job specification has been changed; and
   - if the changed job specification complies, executing the job according to the changed job specification; and
   - if the changed job specification does not comply, determining a second job setting to change and a job setting value to change the second job setting to in order to make the thus changed job specification comply with the intent, and executing the job according to the thus changed job specification.

9. The printer controller according to claim 8 further comprising a user interface and wherein the user interface is arranged to display a screen to allow a user to change the job specification by changing at least one first job setting of the job specification.

10. The printer controller according to claim 8 or 9, wherein the intent represents at least one of:
    - a direct specification of a required property of the resulting final print product, and
    - an optimisation target which target is to be maximised or minimised during execution of the print job.

11. A print system comprising:

- at least one print engine for providing print media with marking material in accordance with a print job, and
- a printer controller according to claim 8, 9, or 10.

12. The print system according to claim 11, further comprising at least one finisher for performing finishing operations in accordance with the print job on the printed media printed by the at least one print engine.

CONCLUSIES

1. Werkwijze voor het uitvoeren van een afdruktaak in overeenstemming met een taakspecificatie, omvattende de stappen van:
   - het ontvangen van een taakspecificatie;
   - het aanpassen van de taakspecificatie door het aanpassen van ten minste een eerste taakinstelling van de taakspecificatie;

   waarbij de ontvangen taakspecificatie een intentie omvat; en
   de werkwijze verder de stappen omvat van:
   - het analyseren of de aangepaste taakspecificatie overeenstemt met de intentie in het licht van de aangepaste eerste taakinstelling;
   - indien de aangepaste taakspecificatie overeenstemt, het uitvoeren van de taak volgens de aangepaste taakspecificatie;
   - indien de aangepaste taakspecificatie niet overeenstemt, het vaststellen van een tweede aan te passen taakinstelling en een taakinstellingswaarde om de tweede taakinstelling naar aan te passen teneinde de aldus aangepaste taakspecificatie in overeenstemming te brengen met de intentie, en het uitvoeren van de taak volgens de aldus aangepaste taakspecificatie.

2. Werkwijze volgens conclusie 1 waarbij de stap van het aanpassen van de taakspecificatie door het aanpassen van ten minste een eerste taakinstelling van de taakspecificatie het aanpassen omvat van ten minste een eerste taakinstelling na het ontvangen van een daartoe strekkende operateursopdracht.

3. Werkwijze voor het specificeren van een afdruktaak omvattende afdrukgegevens, de afdruktaak uit te voeren door enige der werkwijzen volgens conclusies 1 of 2, de specificatiewerkwijze omvattende de stappen van:
   - het specificeren van taakinstellingen voor de afdruktaak;
   - het registreren van de taakinstellingen in ten minste een van:
     - de afdrukgegevens van de afdruktaak, en
     - een taakticket voor de afdruktaak;
   - het specificeren van een intentie; en

- het registreren van de intentie in ten minste een van:
  - de afdrukgegevens van de afdruktaak, en
  - een taakticket voor de afdruktaak.

4. Werkwijze volgens conclusie 1, 2, of 3, waarbij de intentie ten minste een van de volgende representeert:
   - een directe specificatie van een vereiste eigenschap van het resulterende, uiteindelijke afdrukproduct, en
   - een optimalisatiedoel welk doel gemaximaliseerd of geminimaliseerd dient te worden gedurende de executie van de afdruktaak.

5. Werkwijze volgens een der voorgaande conclusies, waarbij een intentie ten minste een van de volgende specificeert:
   - een directe specificatie van de beoogde grootte van een vel van het door de afdruktaak te produceren uiteindelijke product,
   - een toe te passen kruipcompensatie (creep compensation),
   - een toe te passen integrale verschuiving,
   - een bijsnijdverschuiving of -uitlijning,
   - een automatische bloedingsruimte (bleed spacing), en
   - een formaat van het afdrukproduct, zoals een boekje of een “flip-over”.

6. Werkwijze volgens een der voorgaande conclusies, waarbij een intentie ten minste een van de volgende specificeert:
   - een maximum “same-up” afdrukspecificatie om het maximaliseren te specificeren van het aantal op een vel af te drukken pagina’s met “same-up” afdrukken,
   - het maximaliseren van een aantal pagina’s in een signatuur,
   - een minimaliseer lege pagina’s specificatie,
   - een minimaliseer-afvalspecificatie,
   - een minimaliseer-aantal-nabewerkingsoperatiesspecificatie, en
   - een minimaliseer-aantal-nabewerkingsapparatenspecification.

7. Computerprogrammaproduct omvat in een niet-vluchtig, computerleesbaar medium dat, indien uitgevoerd op een processor, de stappen uitvoert van de werkwijze van een der voorgaande conclusies.

8. Afdrukkerbesturing voor het beheren van een afdruktaak gespecificeerd door een taakspecificatie en het besturen van een afdrukinrichting om de afdruktaak af te drukken in overeenstemming met de taakspecificatie, de besturing omvattende:

– een communicatiemiddel ingericht voor het ontvangen van een afdruktaak;

waarbij het beheren van een afdruktaak het aanpassen van een taakspecificatie omvat voor de ontvangen afdruktaak door het aanpassen van een taakinstelling van de taakspecificatie;

waarbij de besturing verder ingericht is om een intentie te lezen uit de taakspecificatie en vast te stellen of de taakspecificatie overeenstemt met de gelezen intentie nadat een taakspecificatie aangepast is; en

– indien de aangepaste taakspecificatie overeenstemt, het uitvoeren van de taak in overeenstemming met de aangepaste taakspecificatie; en

– indien de aangepaste taakspecificatie niet overeenstemt, het vaststellen van een tweede aan te passen taakinstelling en een taakinstellingswaarde om de tweede taakinstelling naar aan te passen teneinde de aldus aangepaste taakspecificatie in overeenstemming te brengen met de intentie, en het uitvoeren van de taak volgens de aldus aangepaste taakspecificatie.

9. De afdrukkerbesturing volgens conclusie 8 verder omvattende een gebruikersinterface en waarbij de gebruikersinterface is ingericht om een scherm te tonen om het een gebruiker mogelijk te maken om een taakspecificatie aan te passen door ten minste een eerste taakinstelling van de taakspecificatie aan te passen.

10. De afdrukkerbesturing volgens conclusie 8 of 9, waarbij de intentie ten minste een van de volgende representeert:

– een directe specificatie van een vereiste eigenschap van het resulterende, uiteindelijke afdrukproduct, en

– een optimalisatiedoel welk doel gemaximaliseerd of geminimaliseerd dient te worden gedurende de executie van de afdruktaak.

11. Afdruksysteem omvattende:
    – ten minste een afdrukinrichting voor het aanbrengen van markeringsmateriaal op een afdrukmedium in overeenstemming met een afdruktaak, en
    – een afdrukkerbesturing volgens conclusie 8, 9, of 10.

12. Het afdruksysteem volgens conclusie 11, verder omvattende ten minste een nabewerkingsinrichting voor het in overeenstemming met de afdruktaak uitvoeren van nabewerkingshandelingen op het bedrukte medium bedrukt door de ten minste een afdrukinrichting.

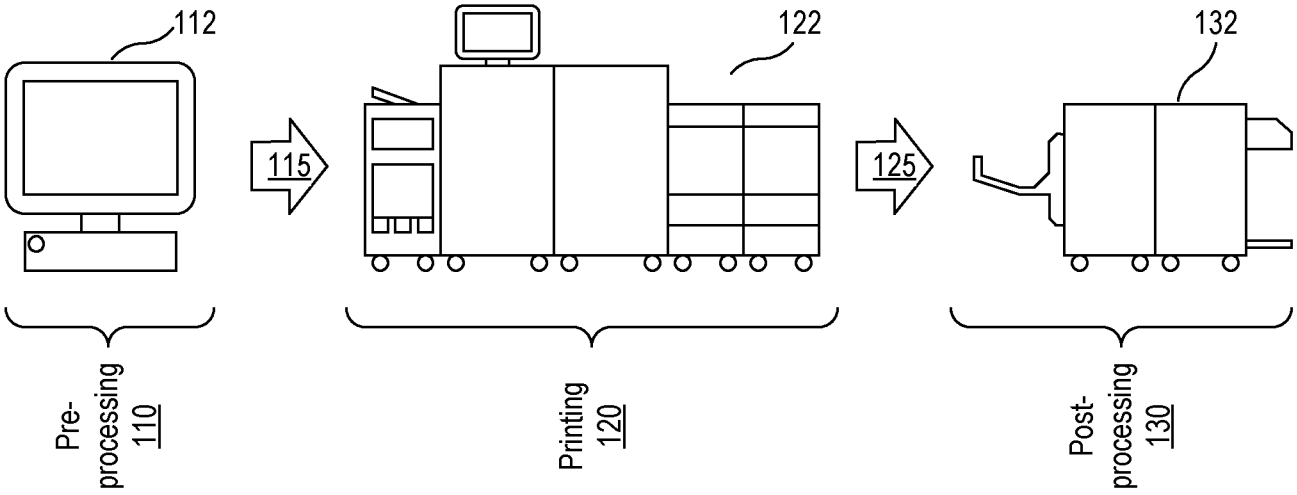
112
115
122
125
132
Pre-processing 110
Printing 120
Post-processing 130

Fig. 1

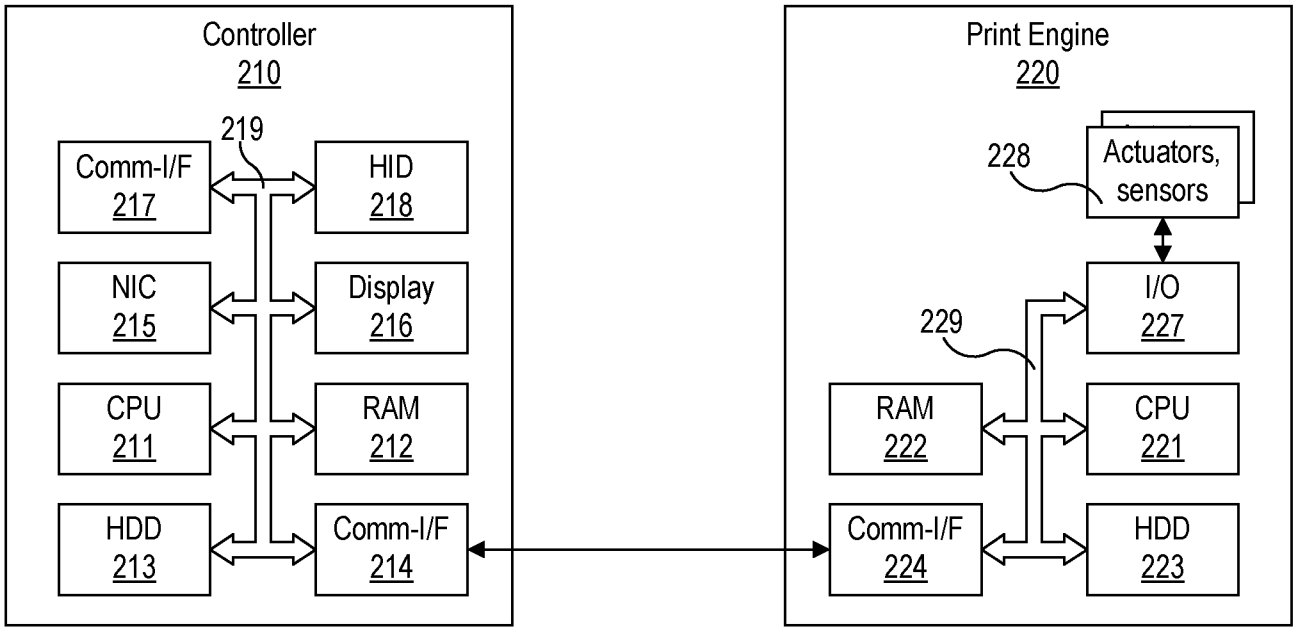
Controller 210
219
Comm-I/F 217
HID 218
NIC 215
Display 216
CPU 211
RAM 212
HDD 213
Comm-I/F 214
Print Engine 220
228
Actuators, sensors
I/O 227
229
RAM 222
CPU 221
Comm-I/F 224
HDD 223

Fig. 2

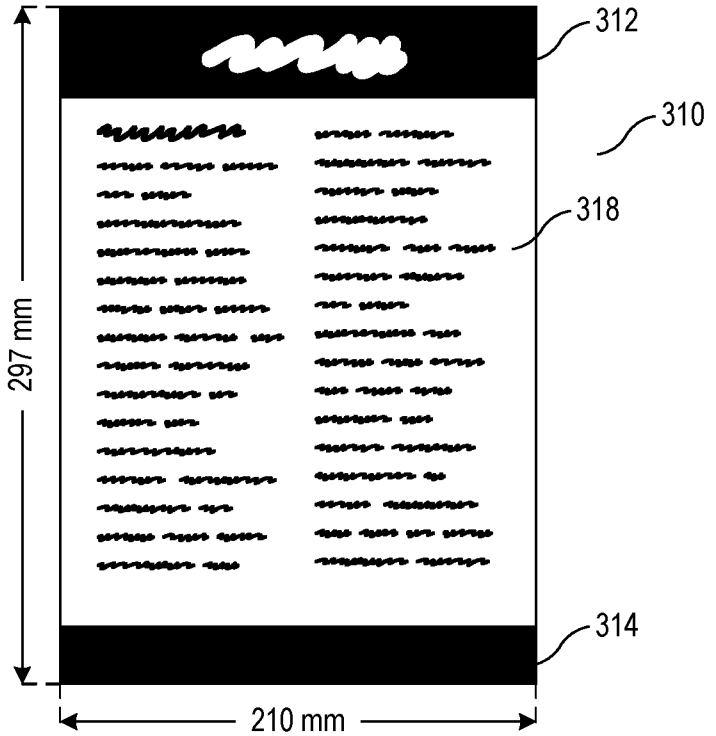

Fig. 3

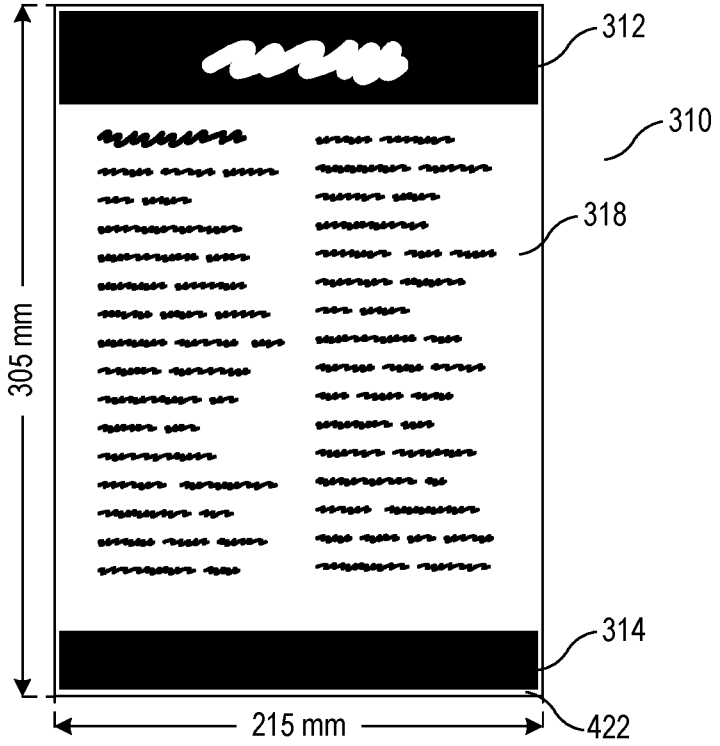

Fig. 4

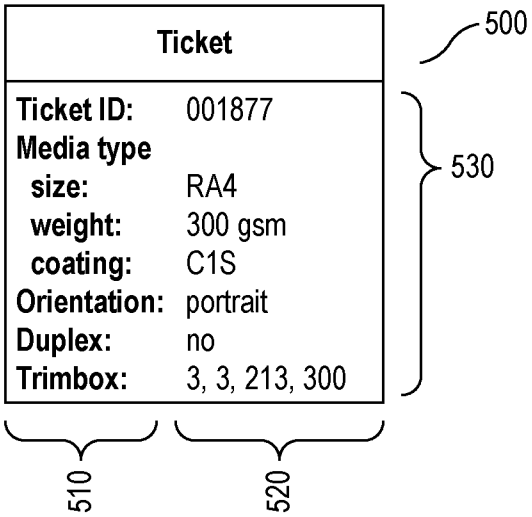
Ticket
500
Ticket ID: 001877
Media type
size: RA4
weight: 300 gsm
coating: C1S
Orientation: portrait
Duplex: no
Trimbox: 3, 3, 213, 300
530
510
520

Fig. 5

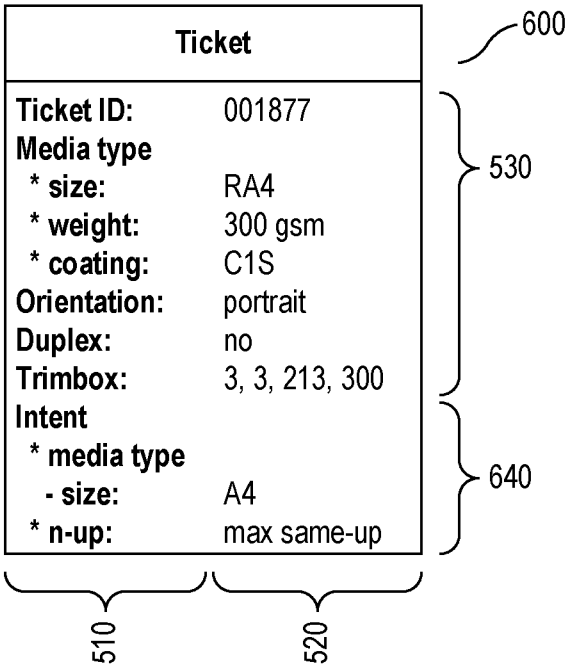
Ticket
600
Ticket ID: 001877
Media type
* size: RA4
* weight: 300 gsm
* coating: C1S
Orientation: portrait
Duplex: no
Trimbox: 3, 3, 213, 300
Intent
* media type
- size: A4
* n-up: max same-up
530
640
510
520

Fig. 6

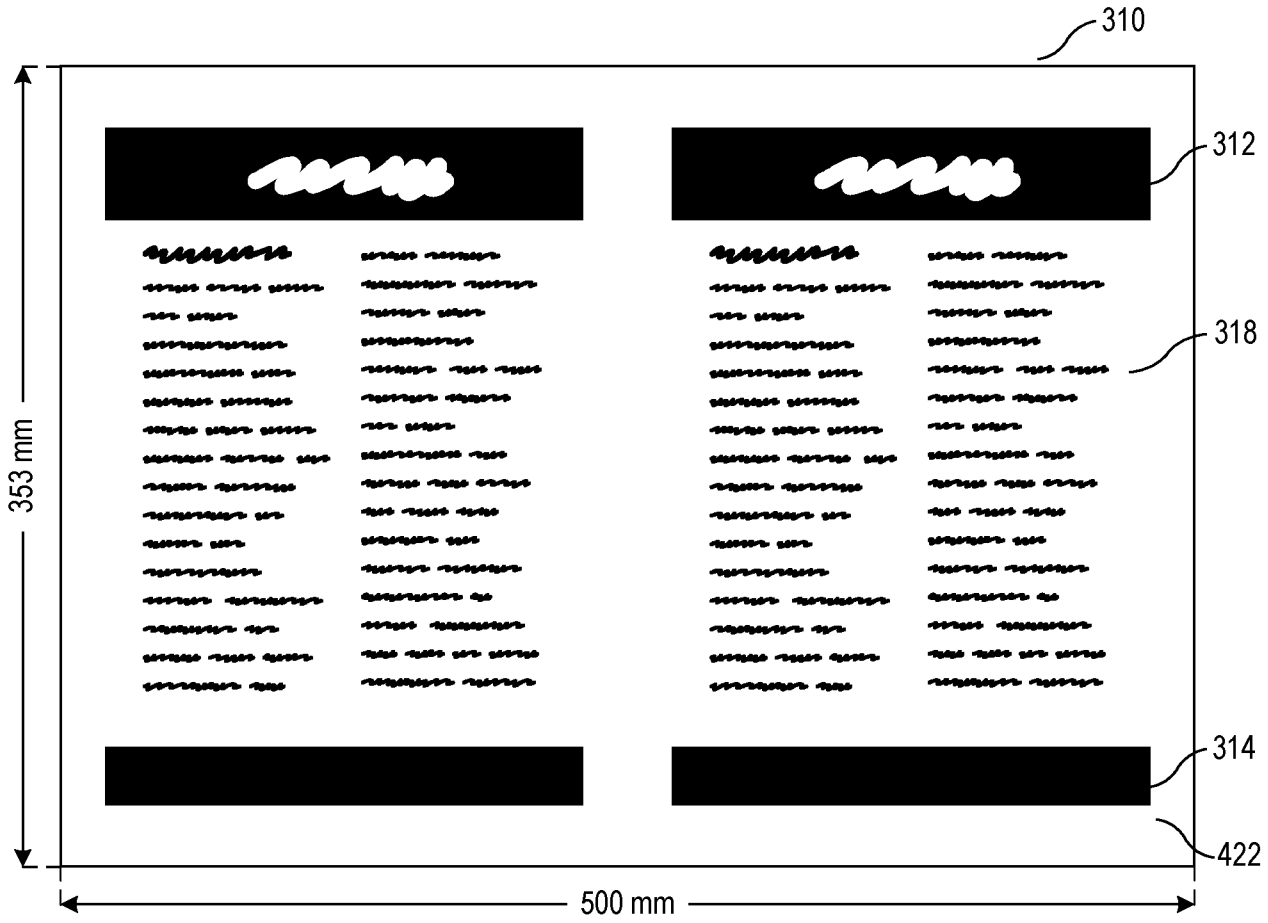

Fig. 7

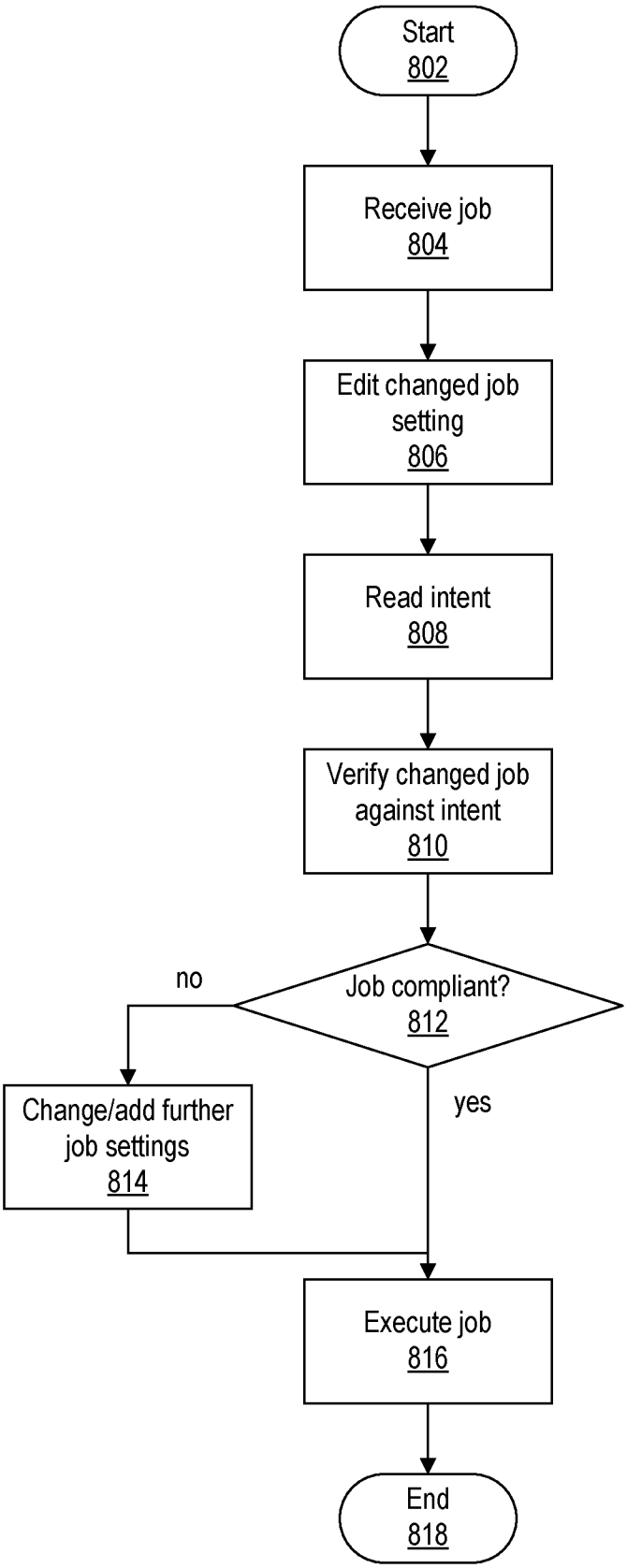
Start
802
Receive job
804
Edit changed job setting
806
Read intent
808
Verify changed job against intent
810
Job compliant?
812
no
yes
Change/add further job settings
814
Execute job
816
End
818

Fig. 8

Rijksdienst voor Ondernemend Nederland

OCTROOIAANVRAAG NR.:
NO 140943
NL 2026099

ONDERZOEKSRAPPORT

BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK

RELEVANTE LITERATUUR

Categorie[1]	Literatuur met, voor zover nodig, aanduiding van speciaal van belang zijnde tekstgedeelten of figuren.	Van belang voor conclusie(s) nr:	Classificatie (IPC)
X	US 2012/224207 A1 (SUESHIGE YOSHIKO [JP]) 6 september 2012 (2012-09-06) * figuren 4A-8 * * alineas [0051] - [0080] * -----	1-12	INV. G06F3/12
X	US 2007/291300 A1 (LEFEBVRE DIDIER [BE] ET AL) 20 december 2007 (2007-12-20) * figuren 1-2 * * alineas [0004] - [0008] * * alineas [0042] - [0073] * -----	1-12	

Onderzochte gebieden van de techniek

G06F

Indien gewijzigde conclusies zijn ingediend, heeft dit rapport betrekking op de conclusies ingediend op:

Plaats van onderzoek:	Datum waarop het onderzoek werd voltooid:	Bevoegd ambtenaar:
's-Gravenhage	26 maart 2021	Vilella, Josep

[1] CATEGORIE VAN DE VERMELDE LITERATUUR

X: de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur
Y: de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht
A: niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft
O: niet-schriftelijke stand van de techniek
P: tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur
T: na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvrage, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding
E: eerdere octrooi(aanvrage), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven
D: in de octrooiaanvrage vermeld
L: om andere redenen vermelde literatuur
&: lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

EOB FORM 02.83 (P0414B)

AANHANGSEL BEHORENDE BIJ HET RAPPORT BETREFFENDE HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK, UITGEVOERD IN DE OCTROOIAANVRAGE NR.

NO 140943
NL 2026099

Het aanhangsel bevat een opgave van elders gepubliceerde octrooiaanvragen of octrooien (zogenaamde leden van dezelfde octrooifamilie), die overeenkomen met octrooischriften genoemd in het rapport.
De opgave is samengesteld aan de hand van gegevens uit het computerbestand van het Europees Octrooibureau per
De juistheid en volledigheid van deze opgave wordt noch door het Europees Octrooibureau, noch door het Bureau voor de Industriële eigendom gegarandeerd; de gegevens worden verstrekt voor informatiedoeleinden.

26-03-2021

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
US 2012224207 A1	06-09-2012	JP 5791311 B2	07-10-2015
		JP 2012181762 A	20-09-2012
		US 2012224207 A1	06-09-2012
US 2007291300 A1	20-12-2007	DE 102004047327 A1	06-04-2006
		EP 1805592 A2	11-07-2007
		US 2007291300 A1	20-12-2007
		WO 2006034858 A2	06-04-2006

Algemene informatie over dit aanhangsel is gepubliceerd in de 'Official Journal' van het Europees Octrooibureau nr 12/82 blz 448 ev

SCHRIFTELIJKE OPINIE

DOSSIER NUMMER	INDIENINGSDATUM	VOORRANGSDATUM	AANVRAAGNUMMER
NO140943	20.07.2020		NL2026099

CLASSIFICATIE
INV. G06F3/12

AANVRAGER
CANON PRODUCTION PRINTING HOLDING B.V.

Deze schriftelijke opinie bevat een toelichting op de volgende onderdelen:

- ☒ Onderdeel I Basis van de schriftelijke opinie
- ☐ Onderdeel II Voorrang
- ☐ Onderdeel III Vaststelling nieuwheid, inventiviteit en industriële toepasbaarheid niet mogelijk
- ☐ Onderdeel IV De aanvraag heeft betrekking op meer dan één uitvinding
- ☒ Onderdeel V Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid
- ☐ Onderdeel VI Andere geciteerde documenten
- ☐ Onderdeel VII Overige gebreken
- ☒ Onderdeel VIII Overige opmerkingen

DE BEVOEGDE AMBTENAAR
Vilella, Josep

Aanvraag nr.:

SCHRIFTELIJKE OPINIE

NL2026099

Onderdeel I Basis van de Schriftelijke Opinie

1. Deze schriftelijke opinie is opgesteld op basis van de meest recente conclusies ingediend voor aanvang van het onderzoek.

2. Met betrekking tot **nucleotide en/of aminozuur sequenties** die genoemd worden in de aanvraag en relevant zijn voor de uitvinding zoals beschreven in de conclusies, is dit onderzoek gedaan op basis van:

   a. type materiaal:

   ☐ sequentie opsomming

   ☐ tabel met betrekking tot de sequentie lijst

   b. vorm van het materiaal:

   ☐ op papier

   ☐ in elektronische vorm

   c. moment van indiening/aanlevering:

   ☐ opgenomen in de aanvraag zoals ingediend

   ☐ samen met de aanvraag elektronisch ingediend

   ☐ later aangeleverd voor het onderzoek

3. ☐ In geval er meer dan één versie of kopie van een sequentie opsomming of tabel met betrekking op een sequentie is ingediend of aangeleverd, zijn de benodigde verklaringen ingediend dat de informatie in de latere of additionele kopieën identiek is aan de aanvraag zoals ingediend of niet meer informatie bevatten dan de aanvraag zoals oorspronkelijk werd ingediend.

4. Overige opmerkingen:

Aanvraag nr.:

SCHRIFTELIJKE OPINIE

NL2026099

Onderdeel V Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid

1. Verklaring

Nieuwheid	Ja:	Conclusies 2, 6, 9
	Nee:	Conclusies 1, 3-5, 7, 8, 10-12
Inventiviteit	Ja:	Conclusies
	Nee:	Conclusies 1-12
Industriële toepasbaarheid	Ja:	Conclusies 1-12
	Nee:	Conclusies

2. Citaties en toelichting:

Zie aparte bladzijde

Onderdeel VIII Overige opmerkingen

De volgende opmerkingen met betrekking tot de duidelijkheid van de conclusies, beschrijving, en figuren, of met betrekking tot de vraag of de conclusies nawerkbaar zijn, worden gemaakt:

Zie aparte bladzijde

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents:

D1 US 2012/224207 A1 (SUESHIGE YOSHIKO [JP]) 6 september 2012 (2012-09-06)

D2 US 2007/291300 A1 (LEFEBVRE DIDIER [BE] ET AL) 20 december 2007 (2007-12-20)

2 The present application does not meet the criteria of patentability, because the subject-matter of claims 1, 3, 7, 8 is not new.

2.1 D1 discloses (the references in parentheses applying to this document):

Afdrukkerbesturing (=print server; =host computer (1)) voor het beheren van een afdruktaak (=print request; =print data received from the application 207) gespecificeerd door een taakspecificatie (=job ticket; =print setting information) (paragraph [0053]; also in paragraph [0058]) en het besturen van een afdrukinrichting (=printer (2)) om de afdruktaak af te drukken in overeenstemming met de taakspecificatie (paragraph [0051]), de besturing omvattende:

- een communicatiemiddel ingericht voor het ontvangen van een afdruktaak (paragraph [0058] and step S501 in figure 5); waarbij het beheren van een afdruktaak het aanpassen van een taakspecificatie omvat voor de ontvangen afdruktaak door het aanpassen van een taakinstelling van de taakspecificatie (paragraph [0058] and steps S502-S504 in figure 5); waarbij de besturing verder ingericht is om een intentie (=setting value for high(est) priority setting item) te lezen uit de taakspecificatie (paragraphs [0059]-[0061]) en vast te stellen of de taakspecificatie overeenstemt met de gelezen intentie nadat een taakspecificatie aangepast is (paragraphs [0059]-[0062] and step S507 in figure 5); en

- indien de aangepaste taakspecificatie overeenstemt, het uitvoeren van de taak in overeenstemming met de aangepaste taakspecificatie (paragraph [0062] and NO in step S507 of figure 5, with paragraph [0051]); en

- indien de aangepaste taakspecificatie niet overeenstemt (paragraph [0062] and YES in step S507 of figure 5), het vaststellen van een tweede aan te passen taakinstelling en een taakinstellingswaarde om de tweede taakinstelling naar aan te passen teneinde de aldus aangepaste taakspecificatie in overeenstemming te brengen met de intentie (paragraphs [0063]-[0064] and step S702 in figure 7), en het uitvoeren van de taak volgens de aldus aangepaste taakspecificatie.

The subject-matter of claim 8 is therefore not new.

2.2 The subject-matter of method and "program" claims 1 and 7 largely corresponds to that of apparatus claim 8. In particular, since neither of claims 1 and 7 comprise any feature beyond those of claim 8, the reasoning of point 2.1 above also applies to claims 1 and 7, whose subject-matter is therefore also not new.

2.3 D1 discloses (the references in parentheses applying to this document):

Werkwijze voor het specificeren van een afdruktaak omvattende afdrukgegevens (paragraphs [0052]-[0055] and [0073]), de afdruktaak uit te voeren door enige der werkwijzen volgens conclusies 1 of 2 (see passages in D1 cited in above point 2.1), de specificatiewerkwijze omvattende de stappen van:

- het specificeren van taakinstellingen (=setting value(s) for the print setting item(s) not having the highest priority from the print setting items set in the print ticket 001) voor de afdruktaak (paragraphs [0052]-[0055] and [0073]);

- het registreren van de taakinstellingen in ten minste een van de afdrukgegevens van de afdruktaak, en een taakticket voor de afdruktaak (paragraph [0058]);

- het specificeren van een intentie (=setting value for the print setting item having the highest priority, from the print setting items set in the print ticket 001) (paragraphs [0052]-[0055] and [0073]); en

- het registreren van de intentie in ten minste een van de afdrukgegevens van de afdruktaak, en een taakticket voor de afdruktaak (paragraph [0058]).

The subject-matter of claim 3 is therefore not new.

2.4 It is also noted that typical print job processing workflows in JDF (Job Definition Format) environments are seen to be within the subject-matter of the independent claims. For instance, D2 is an example thereof (see in D2 the passages cited in the search report and in particular paragraph [0007]), since it

discloses that an incoming JDF job may merely contain intent nodes, and that the print settings and device parameters to fulfill said intents are subsequently set in steps. For reference, it is noted that the JDF standard also discloses that an operator may effect changes on a job, that capabilities may refer to a product intent, and that a pre-flight for a job may carry out an arbitrary set of tests to determine whether the detailed job definition fulfills capabilities of downstream devices which are to process the job.

3 Dependent claims 2, 4-6, 9-12 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of novelty (claims 4-5, 10-11) and/or inventive step (claims 2, 6, 9, 12). The reasons being as follows:

3.1 The additional features of claims 4-5, 10-11 are known from D1:

- Claims 4 and 10: paragraphs [0052]-[0055] and [0073]
- Claim 5: paragraph [0073].
- Claim 11: see the passages cited in above point 2.1, and in particular paragraph [0051] for what concerns a disclosure of a print engine.

3.2 The additional features of claims 2 and 9 merely represent a commonly employed means for changing the print parameters for a print job.

3.3 The additional features of claim 6 represent commonly employed intents in the field of production printing.

3.4 The additional features of claim 12 merely represent commonly employed print settings and commonly employed output resources to implement them.

Re Item VIII

Certain observations on the application

4 The definitions of the invention given in independent method claims 1 and 3, each stating a different combination of limitations expressed at different levels of generalisation, are such that the subject matter for which protection is sought cannot be determined and therefore the current set of claims as a whole is neither clear nor concise.

The current set of claims also leaves a doubt about what the applicant considers to be the essential features of the alleged invention.