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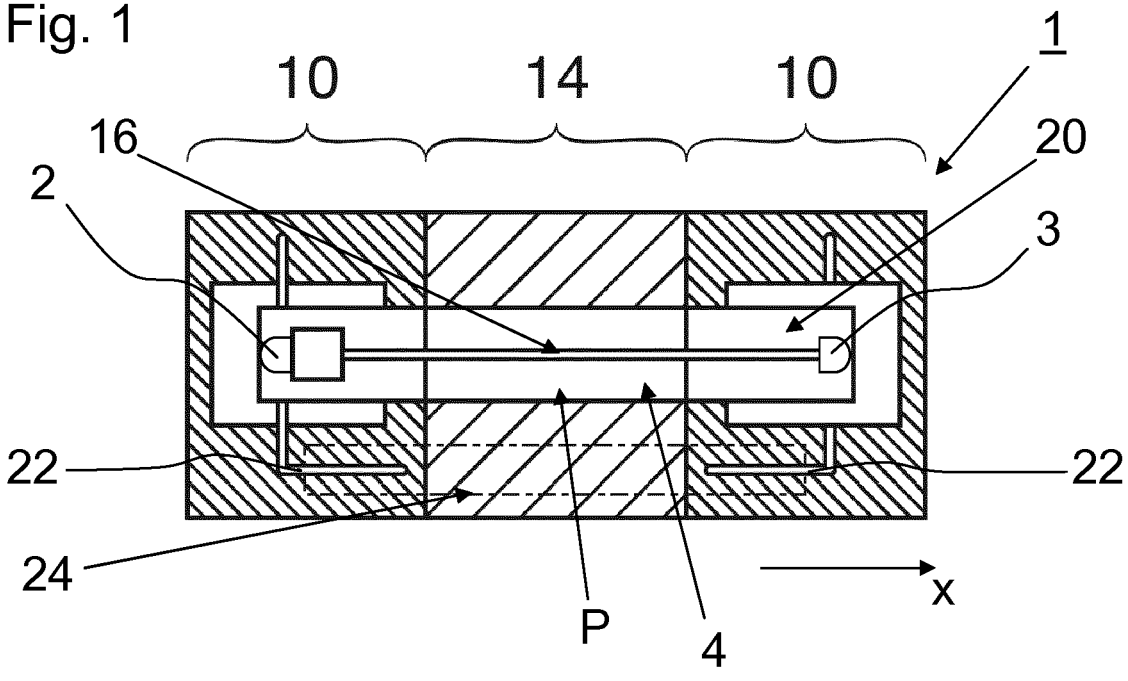
(54) **MODULAR WIDE FORMAT PRINTER**

(57) A modular wide format printer comprises two side modules, each of which comprises a print head support holder for supporting a print head support, a bearing support arranged for rotatably supporting a media roll, and a side module connection interface for connecting the first and second side modules to one another. In an assemble state, the side modules are connected to one another, such that a print head support extending in a width direction of the printer is supported on the print head support holders, a media roll extending in the width direction is rotatably supported on the bearing supports of the first and second side modules, and a print surface extends in the width direction between the side modules for supporting a recording medium during printing. Different sizes of the printer can be achieved with by providing a number of intermediate modules between the side modules.

Fig. 1



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Description

[0001] The invention relates to a modular wide format printer, as well as to a side module and an intermediate module for use in such a printer.

[0002] A conventional printer of this type has two lateral frame members interconnected by a central part that extends in the width direction and defines a media transport path adapted to advance a recording medium in a direction normal to the width direction. The printer may have one or more print heads that extend in the width direction and are arranged to cover the entire image range. In a wide format printer, it is known to use a print head that is mounted on a carriage that is movable along a guide rail in the width direction so as to scan the recording medium.

[0003] The width of the frame structure, especially the width of the central part thereof, must be large enough to cover an image range that is determined by the maximum media format that the printer is configured to process. Depending upon the requirements of the users, the maximum media format may vary within a relatively large range, e.g. from an A3 landscape format to an A0 portrait format and larger. As a consequence, conventional wide format printers are available in a large variety of different sizes.

[0004] It is an object of the invention to reduce the manufacturing costs for wide format printers.

[0005] In a first aspect, the present invention provides a modular wide format printer, comprising:

a first and a second side module, each of which comprises:

- a print head support holder arranged for holding a print head support;
- a bearing support arranged for rotatably supporting a media roll;
- and a side module connection interface for, preferably detachably, connecting the first and second side modules to one another,

wherein the first and second side module are connected to one another, such that:

- a print head support extending in a width direction of the printer is supported on the print head support holders of the first and second side modules;
- a media roll extending in the width direction is rotatably supported on the bearing supports of the first and second side modules; and
- a print surface extends in the width direction between the side modules for supporting a recording medium during printing.

[0006] The printer has a modular design. The two side modules comprise means for supporting a media roll and a print head support, such that in an assembled state media may be supplied from a media roll supported by the bearing supports to a print head on the print head support supported by the print head support holder. Below the print head the medium is supported on a print surface, which is formed by connecting the side modules to one another. To that end, each side module comprises a mechanical side module connection interface. Said connection interfaces allow for a suitable assembly. The width of the printer may be determined by the connection between the side modules. In a first example, for a small print format or width, the side modules connection interfaces are directly connected together, while, in a second example, for larger formats the side modules may be connected via one or more intermediate modules. In the first example, the side module connection interfaces may be mating for a suitable assembly of the printer, whereas in the latter example one or more intermediate modules may comprise an intermediate module connection interface mating with one or more side module connection interfaces and preferably with one or more intermediate module interfaces of other intermediate modules. This has the advantage that it is no longer necessary to produce a large variety of printers with different sizes, but instead the different sizes can be achieved with a smaller number of different component parts, i.e. two side modules and optionally a number of intermediate modules. In an extreme example, there may be only a single type of intermediate module which determines the raster in which the width of the printer can be varied.

[0007] In addition to improved cost efficiency, the invention has the advantage that even an existing printer may be upgraded for wider formats simply by adding further intermediate modules.

[0008] The possibility to postpone the final assembly of the printer until the modules have been shipped to the user offers the further advantage that the component parts or modules can be shipped in a more compact state. Thereby, the object of the present invention has been achieved.

Preferred embodiments and useful details of the invention are indicated in the dependent claims.

[0009] Preferably, the side module connection interfaces, and optionally the intermediate module connection interfaces, are mechanical connection interfaces for detachably attaching side modules and/or intermediate modules to one another. The detachable connection allows for easy assembly as well as for adjustment of the printer, for example when inserting or removing an intermediate module. Connection interfaces which are to be connected to one another may be mating, for example by means of corresponding shapes, such as a male-female connection. In an embodiment, the connection interfaces may further be electronic connection interfaces arranged for transferring an electronic signal or current from one module to another module.

[0010] In a preferred embodiment, the frame structure of the printer will define a media transport path arranged

to advance recording media between the two side modules in a direction normal to the width direction of the printer. Then, each intermediate module will form a part of the transport path, suitably aligned with neighbouring modules (intermediate modules or side modules) which will form other parts of the transport path.

[0011] In printers like ink jet printers, the media transport path will comprise a platen or print surface over which the recording medium is advanced and where the print head is arranged for forming an image on the recording medium. Then, at least each intermediate module will form a part of the print surface that extends over the entire width of the respective module. Marginal parts of the print surface at the opposite sides of the media transport path may be formed by the side modules.

[0012] In an embodiment, the modular wide format printing system according to the present invention, further comprises a transport path delimited by the print surface and the first and second side modules. The transport path extends, in the assembled state of the printer, from the media roll to the print surface. In another embodiment, the print surface, the print head support, and the first and second side modules define a transport opening through which the transport path extends. The medium is supplied from the media roll into the transport opening, whereafter the medium is transported to the print head for printing.

[0013] In a further embodiment, one of the first and second side modules comprises an actuator for rotating the media roll. The actuator may be an electric DC or step motor. By including an actuator in one or both side modules, no separate installation of a driving means for the media is required, thereby reducing installation time. Preferably, in the assembled state, the actuator is arranged for advancing a recording medium with respect to the print head support along a media transport path defined by the support surface and the first and second side modules in a direction normal to the width direction. Alternatively or additionally, one or more transport devices, such as rollers or pinches, may be provided along the transport path for moving the web along the transport path.

[0014] In a further embodiment, the side module connection interfaces are arranged for aligning the bearing supports and the print head support holders of the first and second side modules with respect to one another in the width direction when connecting the side modules to one another. By connecting the side modules to one another, either directly or via intermediate modules, the bearing supports are positioned with respect to one another, such that they may support a media roll extending in the width direction. Simultaneously, the print head support holders are aligned to allow them to support a print head support running parallel to the width direction. Thus, alignment of the bearing supports and the print head support holders is performed in the step of connecting the side modules, simplifying the assembly of the printer.

[0015] In another embodiment, in the assembled state, the printer further comprises a connector bridge extending in the width direction between the first and second side modules, wherein the connector bridge comprises the print surface. The connector bridge forms or defines the connection between the side modules. In an embodiment, a side module comprises the connector bridge, which extends from a vertical section of the side module in the width direction. The free end of the connector bridge then comprises the side module connection interface and may thereby be connected to the other side module. Alternatively, both side modules may comprise part of the connector bridge. The connector bridge may comprise a plate, a profile or beam element extending in the width direction, whereupon the print surface may be provided. By means of the connector bridge the print surface is positioned, with respect to the print head in the assembled state, in the step of connecting the side modules. The side modules are connected to one another by the connector bridge extending between them.

[0016] In a further embodiment, the connector bridge comprises an intermediate module detachably connectable to at least one of the first and second side modules. The intermediate module comprises intermediate module connection interfaces at opposite ends of the intermediate module. One of said intermediate module connection interfaces is complementary or mating to the side module connection interface of one of the first and second side modules. The connector bridge defines the distance between the side modules, which in turn define the width of the print surface and thereby the maximum width for the media. The intermediate modules make the connector bridge modular. For example, the shortest width of the print surface or medium may be obtained by directly connecting the side modules together, while wider widths or formats may be obtained by adding one or more intermediate modules. The width of the intermediate modules may be chosen in correspondence to standard paper formats, such as A3 to A0 in landscape or portrait orientation. The number of intermediate modules of the frame structure may be made as large as desired in order to cover the required width range of the media to be processed. Thus, the width of the printer may be determined by concatenating a suitable number of intermediate modules between the side modules.

[0017] In a further embodiment, the connector bridge comprises a plurality of intermediate modules detachably connectable to one another, wherein each intermediate module comprises an intermediate module connection interface complementary to an intermediate module connection interface of a further one of the plurality of intermediate modules. When intermediate modules are applied, one intermediate module connection interface of an intermediate module is mating with the side module connection interface of the first side module, while one intermediate module connection interface of the same or of a further intermediate module mates with the side module connection interface of the second side module. For connections between intermediate modules, connecting

intermediate module connection interfaces may be mating. In a preferred embodiment, a single type of connection interface is applied between intermediate and side modules. For example, all connection interfaces on a left side of a module in the assembled state may be similar (or identical) to one another, comprising e.g. a male connector element, while all connection interfaces on a right side of a module may be similar to one another. Alternatively, a single universal connection interface may be applied for all connection interfaces, e.g. comprising a combined male-female connector.

[0018] In a further embodiment, the printer further comprises a print head support with a guide rail, the printer further comprising a print head carriage that is movable along the guide rail. When a print head is mounted on a reciprocating carriage, a single print head may be sufficient for covering the entire image range. Then, the frame structure will comprise at least one guide rail for guiding the print head carriage. It is possible to use continuous guide rails that extend over the entire width of the printer. As an alternative, the guide rails may also be divided into decomposable modules. Then, the butting surfaces at the ends of the guide rail modules are preferably inclined relative to the direction of travel of the carriage in order to smoothen the transition when the carriage passes from one guide rail module to the other. Thereto, the guide rail may in another embodiment, be composed of detachable guide rail modules that are aligned with each other and butted together to form a continuous track for the print head carriage extending continuously between the print head support holders. It is preferred that the guide rail modules have butting end faces that are inclined relative to the longitudinal direction of the guide rail for an easy assembly of the guide rail.

[0019] In another embodiment, the printer comprises at least two separate guide rails that are mounted on different side modules and/or intermediate modules and arranged to overlap with one another in said width direction.

[0020] In a modified embodiment, each intermediate module may have its own print head and possibly its own guide rail or rails for the print head carriage. Then, as is generally known in the art, the print heads in the different modules may be controlled such that the printed image is "stitched" together from a plurality of stripes each of which is printed with one of the modules. In order to smoothen the transitions between neighbouring stripes, interleaving pixel patterns may be used at the stripe boundaries, similar to the interleaving pixel patterns used at swathe boundaries in multi-pass ink jet printing.

[0021] In a further embodiment, each module is provided with one or more stationary arranged print heads, which may be staggered or aligned with print heads of adjacent modules to form a printer wide print head array.

[0022] In a compact embodiment, the intermediate module has a C-shaped cross-section straddling the media roll. Basically, the intermediate module comprises a recess for holding the media roll.

[0023] In another aspect, the present invention provides a side module for use in the modular wide format printer according to the present invention, comprising:

- a print head support holder arranged for holding a print head support;
- a bearing support arranged for rotatably supporting a media roll; and
- a side module connection interface.

[0024] In a further aspect, the present invention provides an intermediate module for use in the modular wide format printer according to present invention, comprising intermediate module connection interfaces at opposite ends of the intermediate module. In a preferred embodiment, the intermediate module comprises a print surface element for supporting at least part of a recording medium.

[0025] Each side module and a number of intermediate modules that are detachably connected to one another via mating connection interfaces such that the intermediate modules are disposed between the two side modules in said width direction, the connection interfaces at opposite ends of at least one intermediate module being complementary to one another and complementary to a respective one of the connection interfaces of the side modules.

[0026] The recording media may be either cut sheets or endless webs that are withdrawn from a media roll. In the latter case, the side modules of the frame structure will have bearing supports for rotatably supporting the media roll (or a core thereof) at its opposite ends. The intermediate modules or at least some of them may have C-shaped support frames for providing access to the media roll for replacing the same when it has been used up.

[0027] Preferred embodiments of the invention will now be described in conjunction with the drawings, wherein:

- Fig. 1 is a schematic top plan view of a printer frame structure according to the invention;
- Fig. 2 is a top plan view of the frame structure shown in Fig. 1 in a configuration for minimum printing width;
- Fig. 3 is a schematic side view of an ink jet printer to which the invention is applicable;
- Fig. 4 is a view of butting ends of two modules of a guide rail in the printer shown in Fig. 3;
- Fig. 5 is a schematic perspective view of a frame structure of a printer according to the invention;
- Fig. 6 shows two modules of the frame structure shown in Fig. 5; and
- Fig. 7 is a top plan view of a frame structure according to a modified embodiment.

[0028] As is shown in Fig. 1, a frame structure for an ink jet printer 1 comprises two side modules 10, 12 and a connector bridge 4 extending between them. The con-

nector bridge 4 may be formed as part of a side module 10, 12 or as an arbitrary number of intermediate modules 14 intervening therebetween. The footprints of the individual modules 14 have been symbolized by different hatching.

[0029] The side modules 10 and 12 each comprise a print head support holder 2, 3, both of which support opposite ends of a continuous guide rail 16. The guide rail 16 forms a print head support 16 that supports a reciprocating print head carriage 18 which has been shown here in a home position in the side module 10 but is arranged to travel over the entire length of the guide rail 16 in a width direction x of the printer. The guide rail 16 is positioned above the print surface 20 by the print head support holders 2,3, which are positioned higher than the print surface 20 on a vertically extending section of a side module 10, 12.

[0030] Although not shown in detail in the drawing, the carriage 18 carries one or more ink jet print heads arranged to print a swathe of an image onto a recording medium that is supported on a print surface 20. Each of the intermediate modules 14 forms a part of the print surface 20 that extends over the entire with of the respective module 14, and each of the side modules 10, 12 forms a part of the print surface that adjoins the part of the print surface that is formed by the adjacent intermediate module 14.

[0031] Each of the side modules 10, 12 forms a bearing support 22 arranged to rotatably support a media roll 24 from which the recording medium can be withdrawn in the form of an endless web. The side module 12 may also accommodate a drive mechanism for driving the media roll 24 and other components of a media transport mechanism (not shown here) for advancing the recording medium over the print surface 20. Components of this mechanism may also be accommodated in the other side module 10 and may be synchronized with the components in the side module 12 either electronically or mechanically via a continuous shaft or the like. Advantageously, the print head support holders 2, 3 as well as the bearing supports 22 are aligned with respect to one another by connecting the side modules 10, 12 to one another by means of the connector bridge 4.

[0032] Further, each of the side modules 10, 12 and the intermediate modules 14 may accommodate a respective part of a cutting mechanism for cutting the media web to a desired length.

[0033] Each intermediate module 14 has connection interfaces 26 and 28 at its opposite ends in the width direction x. These connection interfaces 26 and 28 are complementary to each other and comprise well known fastening means (not shown in detail) adapted to firmly connect the modules to one another. In this way, the intermediate modules 14 may be concatenated by joining each connection interface 26 to a complementary interface 28 of the next module. Similarly, the side module 10 has a connection interface 30 that is complementary to the connection interfaces 26 of the intermediate modules 14, and the other side module 12 has a connection interface 32 complementary to the other connection interface 28 of the intermediate modules 14. Similarly, the connection interfaces 26, 28 may be arranged for transferring an electronic signal from one end of the printer 1 to the other, for example for synchronizing actuators in the side modules 10, 12.

[0034] Thus, the width of the printer may be varied as desired by adding or removing one or more of the intermediate modules 14, resulting in a versatile printing system. As an example, Fig. 1 shows a configuration with only a single intermediate module 14 and the side modules 10, 12 directly attached thereto, while in Fig. 2 multiple intermediate modules 14 are connected between the side modules 10, 12. A minimum width of the printer 1 may be achieved by connecting the side modules 10, 12 directly together via their side module connection interfaces 26, 28. Preferably, the side modules 10, 12 and intermediate modules 14 are dimensioned to form a print surface 20 with a width corresponding to a standard page format A0, A1, etc.

[0035] Of course, when the width of the printer 1 is changed, the guide rail 16 or guide rails (there may be more than one guide rail) have to be adapted. For example, the guide rails 16 may be replaced by guide rails with a different length.

[0036] The length of the media roll 24 must also be compatible with the width of the printer. More precisely, this applies to the length of a winding core that has its opposite ends supported on the bearing supports 22 and carries a coil of the media web. The width of the media web itself may be smaller, so that it is possible to process recording media of different widths on the same printer, up to a maximum width that is determined by the configuration of the frame structure (i.e. the number of intermediate modules 14).

[0037] In the example shown here, all intermediate modules 14 have an identical design. It is possible however to provide a plurality of intermediate modules 14 with different designs, as long as the connection interfaces 26 and 28 are compatible with one another. For example, there may be two or more types of intermediate modules 14 which differ in their widths, so that the widths of the printer as a whole may be varied in finer steps by using suitable combinations of intermediate modules.

[0038] Fig. 3 is a schematic side view of an ink jet printer embodying the principles that have been described in conjunction with Figs. 1 and 2.

[0039] The print surface 20 is formed at the top of the intermediate modules 14 one of which has been shown in cross-section in Fig. 3.

[0040] The guide rail 16 for the print head carriage 18 is supported in upwardly protecting parts of the side modules 10, 12. The carriage 18 is suspended from and guided at the guide rail 16 and includes a drive mechanism for moving the carriage along the guide rail. For that purpose, one side surface of the guide rail 16 may be configured as a rack for engagement of a pinion of the drive

mechanism. For exact position control of the carriage 18, a ruler, e.g. a magnetic ruler (not shown) may applied to the guide rail 16 so as to extend continuously from one end of the printer to the other. The ruler may take the form of a flexible strip that is expanded and applied to the guide rail 16 after the modules 10, 12, 14 of the frame structure have been assembled.

[0041] In another embodiment the carriage 18 may be driven by means of a spindle drive having a spindle that extends over the entire width between the side modules 10, 12.

[0042] The intermediate modules 14 have a C-shaped cross-section straddling the media roll 24 so as to permit access to the media roll from the left side in Fig. 3. The opposite ends of the media roll 24 or rather a core 24' thereof are rotatably supported in the side modules 10, 12.

[0043] A pull-off mechanism 34 is provided for withdrawing a media web 36 from the roll 24. In the example shown, the pull-off mechanism 34 comprises rollers 38 that form a nip for the web 36 and are mounted on axles that extend continuously over the entire width of the printer and are supported with their opposite ends in the side modules 10, 12. One of the side modules, e.g. the side module 12, may comprise a drive motor for at least one of these axles. The rollers 38 themselves need not be continuous but may be provided locally in each of the intermediate modules 14 and, if necessary, in the corresponding parts of the side modules 10, 12.

[0044] Fig. 3 further illustrates the transport path P extending from the media roll 36 to the print head carriage 18, and from there to the discharge tray 50. Note that the web slides below the print head carriage 18 via an opening between the print head support 16 and the print support surface 20. Similarly, a web guide 40 may be provided locally in each of the modules to locally define the transport path P.

[0045] In the example shown, the printer 1 further comprises a cutting mechanism 42 for cutting the web 36 to a desired length. The cutting mechanism 42 may comprise separate cutter blades which are arranged in each of the modules for forming a continuous cut through the entire width of the web. As has been indicated in phantom lines in Fig. 3, the parts of the cutting mechanisms in adjacent modules may be arranged in alternating positions so that the ends of the blades do not interfere with one another. For cutting the web, the movement of the web may be stopped temporarily and the cutting mechanisms in the adjacent modules are activated at different timings so that even in the cutting position the ends of one blade will not collide with the blades in the neighbouring modules.

[0046] As an alternative, the cutting mechanism may comprise a movable blade that travels over the entire width of the printer similarly as the carriage 18.

[0047] A feed mechanism 44 is provided for feeding the cut web over the print surface 20.

[0048] Similarly as the pull-off mechanism 34, the feed mechanism comprises rollers 46 that are mounted in each of the modules but are fixed on a continuous axle that is driven by a motor in the side module 12. Web guides 48 are provided for guiding the web from one roller to the other.

[0049] While the feed mechanism 44 feeds the web over the print surface 20 in a sub-scanning direction y, the print head carriage 18 travels back and forth along the guide rail 16 to scan the web in the width direction (main scanning direction) x. The printed web may be discharged on the left side of the printer in Fig. 3. In this example, however, a discharge mechanism 48 has been provided for deflecting the printed sheets to the opposite side and onto a discharge tray 50. It will be understood that the discharge mechanism 48 is also divided into modules corresponding to the modules of the frame structure and comprises rollers 52 that are driven by a motor in the one of the modules of the discharge mechanism that is mounted on top of the side module 12, for example. The discharge tray 50 may also have a modular structure and may be formed of suitably bent wire bows.

[0050] An operating panel 54 for controlling the operation of the printer is provided, in this example, on top of one of the modules of the discharge mechanism 48 and is oriented such that it can be operated from the left side in Fig. 3, i.e. the same side from which the media roll 24 is accessible.

[0051] In an alternative embodiment, the guide rail 16 may also be divided into modules 16a, 16b, as has been illustrated in Fig. 4. For example, each module of the guide rail 16 may extend over the entire width of a corresponding one of the modules 10, 12 and 14 of the frame structure, and the adjacent ends of the guide rail modules 16a, 16b are butted together so as to form a continuous path for the print head carriage. In the example shown in Fig. 4, the butting surfaces 56 at the ends of the guide rail modules 16a, 16b are inclined relative to the longitudinal axis of the guide rail so as to assure a smooth transition and avoid any shocks when the carriage passes over the joint where the guide rail modules are butted together. A centring pin 58 and a centring bore 60 are brought into fitting engagement with one another to assure a precise alignment of the guide rail modules 16a, 16b.

[0052] Fig. 5 is a perspective view of a frame structure according to a slightly modified embodiment. In this case, the frame structure is configured as a portal with the media roll 24 being freely supported between the legs of the portal. These legs are formed by L-shaped side modules 10 and 12, and the intermediate modules 14 are box shaped and arranged to bridge the gap between the top parts of the side modules 10 and 12. A continuous slot 62 is provided in the top parts of the modules for permitting the web 36 to enter into the modules and to be fed over the print surface which is not visible here.

[0053] Each of the intermediate modules 14 is supported on an L-shaped support leg 64 which is open toward the side from which the media roll 24 is replaced. Similar

support legs 66 are provided to support the cantilever-type top parts of the side modules 10 and 12, so that the side modules 10 and 12 can be stably placed on the ground as stand-alone modules, before they are interconnected by the intermediate modules 14.

[0054] Fig. 6 shows two of the intermediate modules 14 from different perspectives so that their complementary connection interfaces 26 and 28 are visible. In the example shown, the connection interface 28 has projecting tabs 68 that fit into corresponding recesses 70 in the complementary connection interface 26. The tabs 68 have bolt holes 72 so that the modules may firmly be fastened to one another by means of bolts.

[0055] Fig. 7 is a top plan view of a frame structure according to another embodiment of the printer 1' according to the present invention. The printer 1' differs from the embodiment of the printer 1 shown in Figs. 1 and 2 in that each module 10, 12, 14' of the frame structure has a separate guide rail 16', 16" and each guide rail carries its own print head carriage 18. In the example shown, five intermediate modules 14' are interposed between the side modules 10 and 12. In top plan view, the intermediate modules 14' have an asymmetric T-shape. All intermediate modules are identical, but they are fitted together in alternatingly inverted orientations so as to form a continuous structure. The guide rails 16' and 16" are offset from the respective centre of the module in the sub-scanning direction y. Consequently, due to the alternating orientations of the intermediate modules 14', the guide rails 16' and 16" form two groups of guide rails that alternate with one another and are offset in the direction y. In the main scanning or width direction x, the guide rails 16' and 16" overlap, so that it is possible to print a continuous image over the entire width of the media web. The print head of each module contributes a stripe of a certain width to the image. At the stripe boundaries, the printed pixel patterns of the adjacent stripes may be interleaved with one another as is well known in the art.

[0056] Although specific embodiments of the invention are illustrated and described herein, it will be appreciated by those of ordinary skill in the art that a variety of alternate and/or equivalent implementations exist. It should be appreciated that the exemplary embodiment or exemplary embodiments are examples only and are not intended to limit the scope, applicability, or configuration in any way. Rather, the foregoing summary and detailed description will provide those skilled in the art with a convenient road map for implementing at least one exemplary embodiment, it being understood that various changes may be made in the function and arrangement of elements described in an exemplary embodiment without departing from the scope as set forth in the appended claims and their legal equivalents. Generally, this application is intended to cover any adaptations or variations of the specific embodiments discussed herein.

[0057] It will also be appreciated that in this document the terms "comprise", "comprising", "include", "including", "contain", "containing", "have", "having", and any variations thereof, are intended to be understood in an inclusive (i.e. non-exclusive) sense, such that the process, method, device, apparatus or system described herein is not limited to those features or parts or elements or steps recited but may include other elements, features, parts or steps not expressly listed or inherent to such process, method, article, or apparatus. Furthermore, the terms "a" and "an" used herein are intended to be understood as meaning one or more unless explicitly stated otherwise. Moreover, the terms "first", "second", "third", etc. are used merely as labels, and are not intended to impose numerical requirements on or to establish a certain ranking of importance of their objects.

[0058] The present 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 present 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.

Claims

1. A modular wide format printer (1, 1'), comprising:

a first and a second side module (10, 12), each of which comprises:

- a print head support holder (2, 3) arranged for holding a print head support (16);
- a bearing support (22) arranged for rotatably supporting a media roll (24);
- and a side module connection interface (30, 32) for connecting the first and second side modules (10, 12) to one another,

wherein the first and second side module (10, 12) are connected to one another, such that:

- a print head support (16) extending in a width direction (x) of the printer (1, 1') is supported on the print head support holders (2, 3) of the first and second side modules (10, 12);
- a media roll (24) extending in the width direction (x) is rotatably supported on the bearing supports (22) of the first and second side modules (10, 12); and
- a print surface (20) extends in the width direction (x) between the side modules (10, 12) for supporting a recording medium (36) during printing.

2. The modular wide format printer (1, 1') according to claim 1, further comprising a transport path (P) delimited by the print surface (20) and the first and second side modules (10, 12).

3. The modular wide format printer (1, 1') according to claim 2, wherein the print surface (20), the print head supports (2, 3), and the first and second side modules (10, 12) define a transport opening through which the transport path (P) extends.

4. The modular wide format printer (1, 1') according to any of the previous claims, wherein one of the first and second side modules (10, 12) comprises an actuator for rotating the media roll (24).

5. The modular wide format printer (1, 1') according to claim 4, wherein, in the assembled state, the actuator is arranged for advancing a recording medium (36) with respect to the print head support (2, 3) along a media transport path (P) defined by the support surface (20) and the first and second side modules (10, 12) in a direction (y) normal to the width direction (x).

6. The modular wide format printer (1, 1') according to any of the previous claims, wherein the side module connection interfaces (30, 32) are arranged for aligning the bearing supports (22) and the print head support holders (2, 3) of the first and second side modules (10, 12) with respect to one another in the width direction (x) when connecting the side modules (10, 12) to one another.

7. The modular wide format printer (1, 1') according to any of the previous claims, wherein, in the assembled state, the printer (1, 1') further comprises a connector bridge (4) extending in the width direction (x) between the first and second side modules (10, 12), wherein the connector bridge (4) comprises the print surface (20).

8. The modular wide format printer (1, 1') according to claim 7, wherein the connector bridge (4) comprises an intermediate module (14; 14') detachably connectable to at least one of the first and second side modules (10, 12), wherein the intermediate module (14; 14') comprises intermediate module connection interfaces (26, 28) at opposite ends of the intermediate module (14; 14'), wherein one of said intermediate module connection interfaces (26, 28) is complementary to the side module connection interface (30, 32) of one of the first and second side modules (10, 12).

9. The modular wide format printer (1, 1') according to claim 7 or 8, wherein the connector bridge (4) comprises a plurality of intermediate modules (14; 14') detachably connectable to one another, wherein each intermediate module (14; 14') comprises an intermediate module connection interface (26, 28) complementary to an intermediate module connection interface (26, 28) of a further one of the plurality of intermediate modules (14; 14').

10. The modular wide format printer (1, 1') according to any of the previous claims, further comprising a print head support (2, 3) with a guide rail (16), the printer (1, 1') further comprising a print head carriage (18) that is movable along the guide rail (16).

11. The modular wide format printer (1) according to claim 10, wherein the guide rail (16) is composed of detachable guide rail modules (16a, 16b) that are aligned with each other and butted together to form a continuous track for the print head carriage (18) extending continuously between the print head support holders (2, 3).

12. The modular wide format printer (1) according to any of the claims 9 to 11, comprising at least two separate guide rails (16', 16") that are mounted on different modules (14') and arranged to overlap with one another in said width direction (x).

13. The modular wide format printer (1, 1') according to any of the claims 9 to 12, wherein the intermediate module (14; 14') has a C-shaped cross-section straddling the media roll (24).

14. A side module (10, 12) for use in the modular wide format printer (1, 1') according to any of the previous claims, comprising:

- a print head support holder (2, 3) arranged for holding a print head support (16);
- a bearing support (22) arranged for rotatably supporting a media roll (24); and
- a side module connection interface (30, 32).

15. An intermediate module (14, 14') for use in the modular wide format printer (1, 1') according to any of the claims 1 to 13, comprising:

- intermediate module connection interfaces (26, 28) at opposite ends of the intermediate module (14; 14'); and
- a print surface element for supporting at least part of a recording medium (36).

Fig. 1

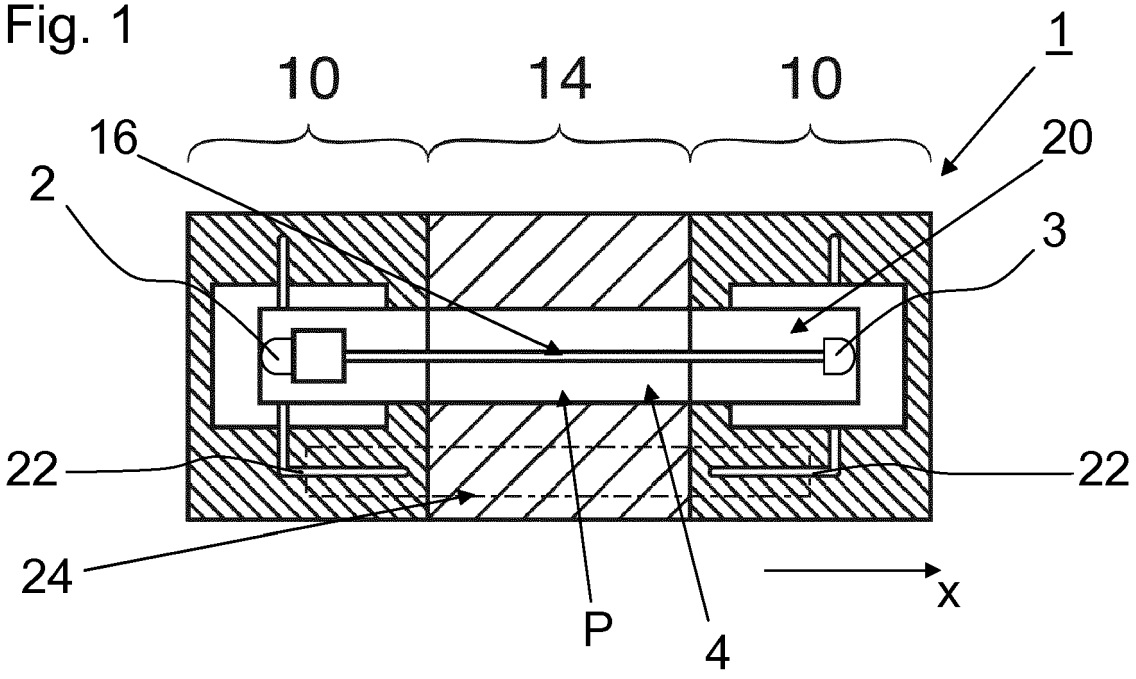

1
10
14
10
16
20
2
3
22
22
24
P
4
x

Fig. 2

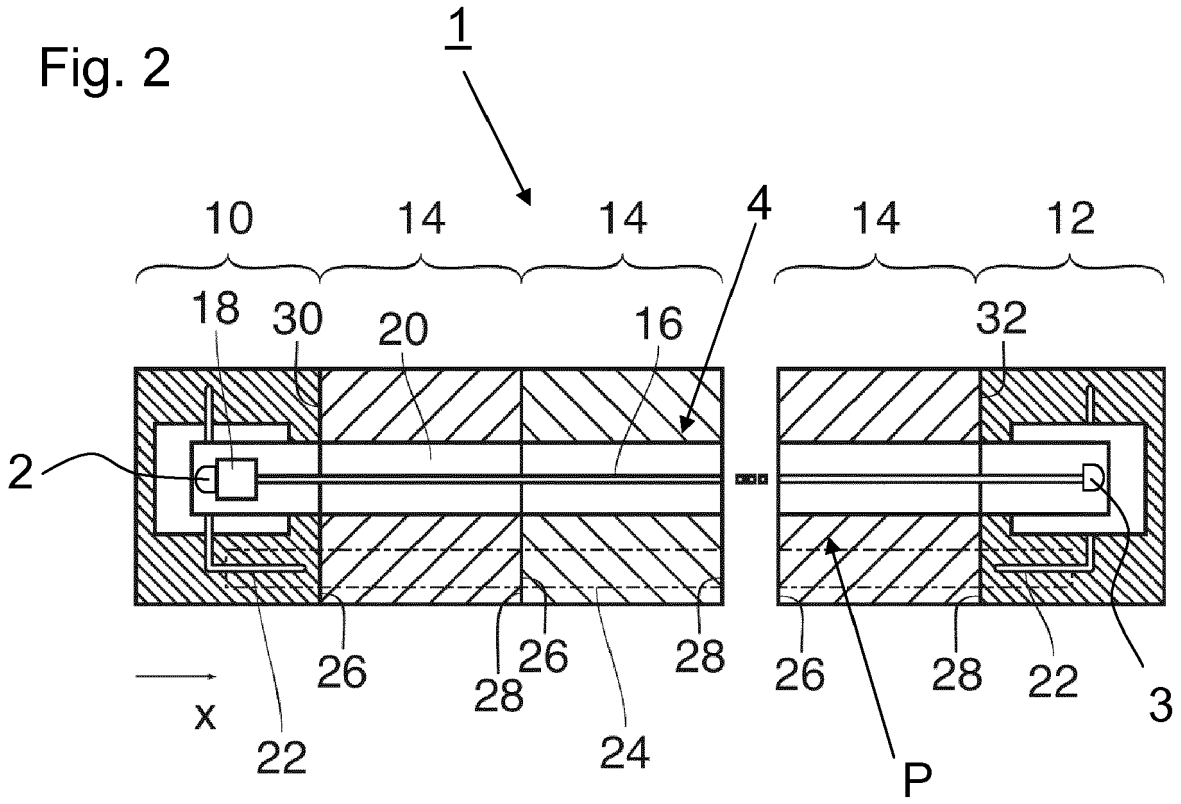

1
10
14
14
4
14
12
18
30
20
16
32
2
26
28
26
28
26
28
22
3
x
22
24
P

Fig. 3

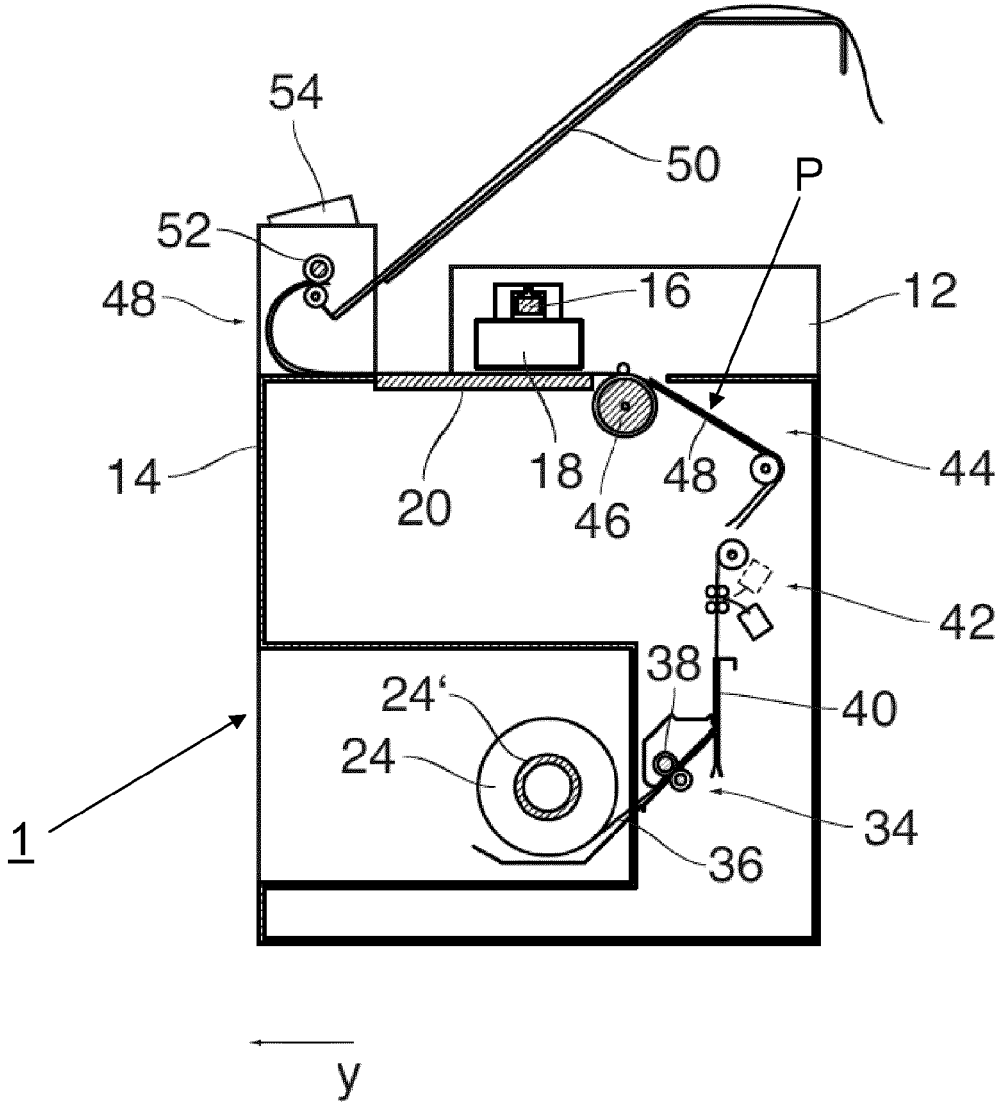

54
50
P
52
48
16
12
14
20
18
46
48
44
42
38
24'
40
24
1
34
36
y

Fig. 4

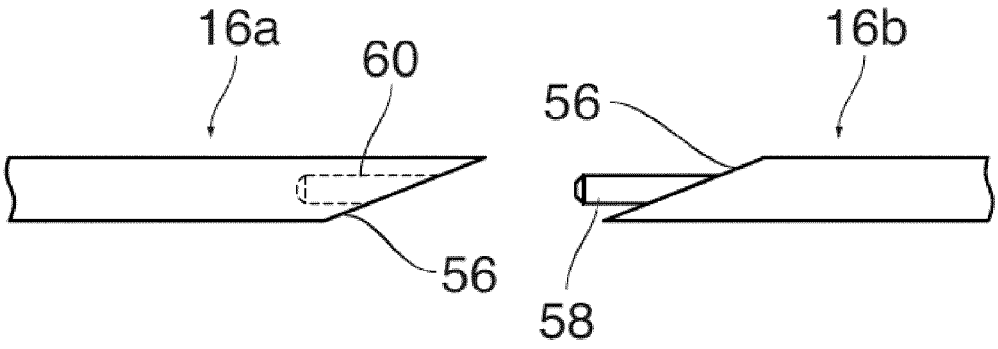

16a
60
16b
56
56
58

Fig. 5

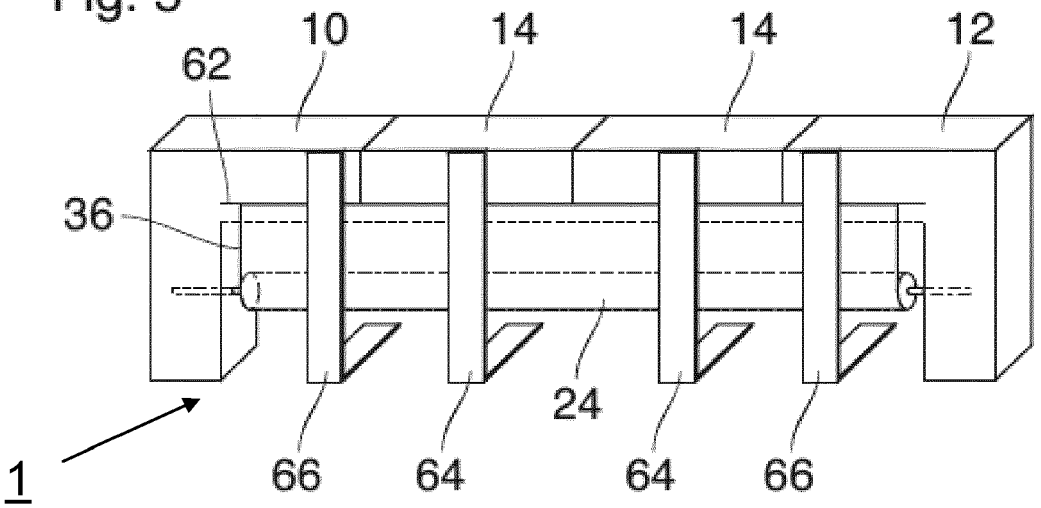


Fig. 6

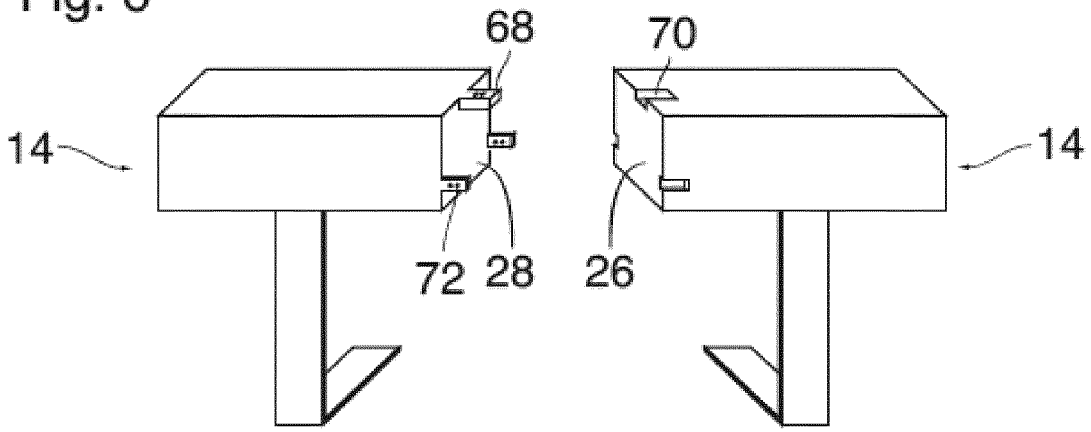
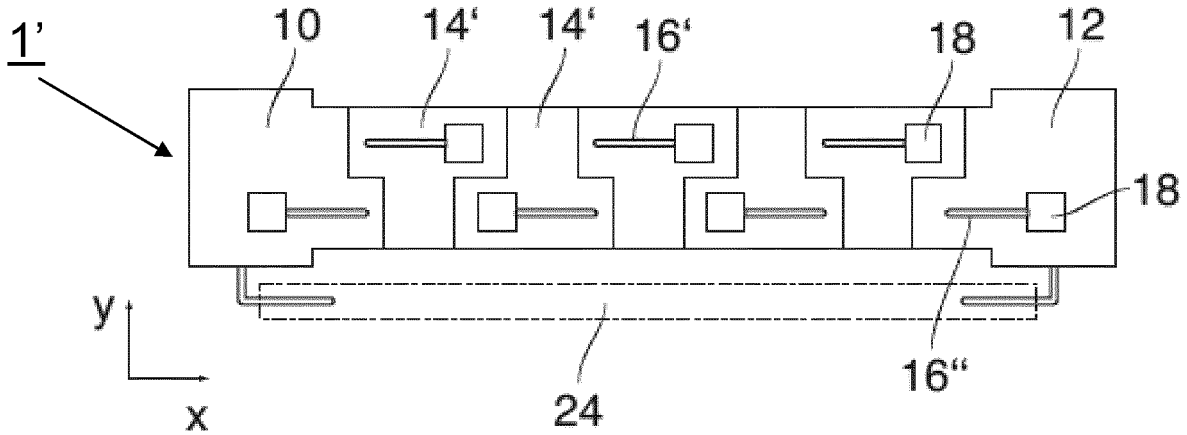


Fig. 7



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EUROPEAN SEARCH REPORT

Application Number
EP 16 15 9040

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B41J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	20 July 2016	Bardet, Maude

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