(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 653 419 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
23.10.2013 Bulletin 2013/43

(51) Int Cl.:
B65H 3/40 *(2006.01)* ***B65H 3/56*** *(2006.01)*

(21) Application number: **12164743.2**

(22) Date of filing: **19.04.2012**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(54) A handling system for transferring printing plates and a method

(57) The invention relates to a handling system (1) for transferring printing plates (2) from a multiple plate stack (3) to an imaging system (4). The handling system (1) comprises a printing plate loader (5) for moving an upper plate of a multiple plate stack (3) to an imaging system (4). The handling system (1) further comprises an interleave paper remover (7). The interleave paper remover (7) comprises a lifting unit (8) for lifting a corner of a plate that is in the upper position on the stack (3) . Further, the interleave paper remover (7) comprises a body (9) provided with a running surface (9s) comprising high frictional material, the body (9) being insertable into a gap formed between the lifted plate corner and a next plate and being arranged for frictionally contacting an interleave paper (6) sticking to a lower surface of the upper plate, so as to peel off the interleave paper (6) from the upper plate.

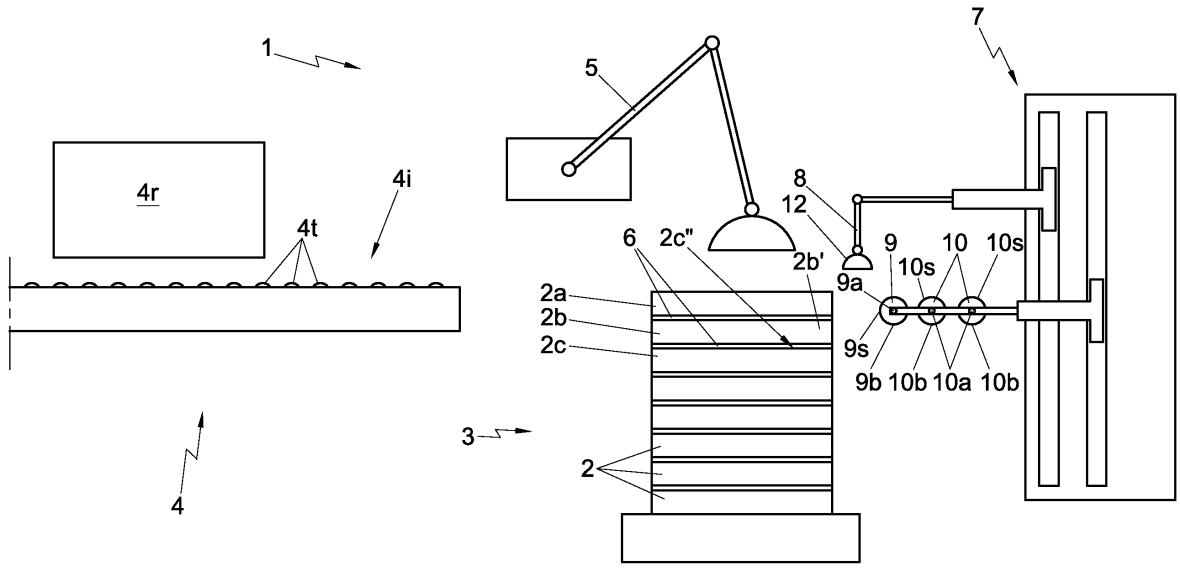

Fig. 1

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Description

[0001] The invention relates to a handling system for transferring printing plates from a multiple plate stack to an imaging system for performing a computer-to-plate imaging process on the printing plates, comprising a printing plate loader for moving an upper plate of a multiple plate stack to an imaging system, the multiple plate stack being formed by stacked printing plates provided with interleave papers sandwiched between subsequent printing plates.

[0002] Traditionally, a prepress process requires the development of a negative or positive film of data to be printed. The film is subsequently copied onto a printing plate. Then, the printing plate is employed for offset printing activities. The computer- to- plate imaging process comprises a digital technology transferring text and/or images directly onto the printing plate by means of a radiation exposure unit. Thereby the intermediate film production is bypassed.

[0003] Several imaging systems are known. For example, a known imaging system for performing a computer-to-plate imaging process on printing plates comprises a plate imaging bed for exposing radiation to a printing plate.

[0004] Also various printing plates are known. For instance, the printing plate comprises a support substrate that can be metal or polymer based. Popular metal supports are aluminium based. Other metal supports comprise copper and/or steel, but polymer supports as used in flexography and polyester based plates are also possible. On the support substrate a radiation sensitive coating is provided which can easily be damaged during handling. In an initial stage, the printing plate is stacked together with a multiple set of printing plates on a multiple plate stack.

[0005] A known multiple plate stack, including a multiple number of stacked printing plates, is supported by a supporting unit, such as a cassette. Between each two subsequent printing plates of the stack an interleave paper is positioned for counteracting damage to the printing plate's surface it is facing and/or for facilitating relatively easily taking apart two subsequent printing plates. During the process, individual printing plates are loaded from the stack towards an input section of the imaging system by means of a loading device, or so called printing plate loader. Subsequently, the printing plate can be locally sensitized by radiation exposed by the imaging system. Then, the printing plate can be transferred to an optional external conveyor system or a chemical processing unit, for plate types that require chemical processing.

[0006] Printing plate loaders are known as well. A known printing plate loader comprises a plate gripper having a suction cup, or so called sucker. In operation, the suction cup grips an initial upper plate of the stack and moves said plate to the imaging system. Subsequently, the interleave paper, initially positioned between the removed upper plate and a next plate on the stack, is then occupying the top position of the stack. Before the printing plate loader can grip the next plate, said current upper interleave paper can be removed from the stack, e.g. using a paper gripper.

[0007] Publication EP 1 772 262 A discloses a paper gripper including two parallel rolls provided with a running surface comprising high frictional material. In use, the rolls are pressed against the paper and rotate in opposite directions, such that the rolls' sides facing the interleave paper move towards each other. Thereby, a part of the interleave paper is curled-up between the rolls. Then, the rolls are moved towards each other in order to clamp said part of the interleave paper between the rolls. Subsequently, while constantly pushing the rolls against each other, the gripper can be pulled away from the stack in order to pull the interleave paper away from the stack.

[0008] Although the known paper gripper might operate acceptable in practice, it is a desire to provide a handling system that is more effective to deal with various interleave paper circumstances.

[0009] It is an object of the invention to provide a handling system according to the preamble, wherein interleave papers can be processed effectively. Thereto, according to the invention, the handling system comprises an interleave paper remover, wherein the interleave paper remover comprises a lifting unit for lifting a corner of a plate that is in the upper position on the stack; and a rotating body provided with a running surface comprising high frictional material, the body being insertable into a gap formed between the lifted plate corner and a next plate, the body further being arranged for frictionally contacting an interleave paper sticking to a lower surface of the upper plate, so as to peel off the interleave paper from the upper plate.

[0010] The invention is partly based on the insight that, in practice, the interleave paper often sticks on the removed printing plate. Although the next printing plate may then be uncovered and free to be gripped by the printing plate loader, the sticking interleave paper may cause severe problems. For example, said interleave paper can later on come off the removed printing plate and can then for instance spoil radiation and/or chemical processing time and/or may cause jamming of the imaging system.

[0011] By providing a body provided with a running surface comprising high frictional material, the body being insertable into a gap formed between a lifted plate corner and a next plate and being arranged for frictionally contacting an interleave paper sticking to a lower surface of the upper plate, so as to peel off the interleave paper from the upper plate, a sticking interleave paper can relatively easily be peeled off from the lower surface of the printing plate, thereby facilitating separation of the interleave paper from the bottom surface of the printing plate and counteracting that the interleave paper keeps sticking on the printing plate during transferring of said plate. In addition, due to the possibility of transferring a first printing plate at least partly simultaneously with separating the interleave paper from the bottom surface of the

following printing plate, the process of transferring printing plates from a multiple plate stack to an imaging system may speed up.

[0012] In a specific embodiment, the body provided with a running surface is rotatable, at least in one rotation direction, around an axis substantially parallel to an upper surface of the next plate. By rotating the body such that the running surface at a body side facing the next plate's upper surface moves from the gap outwardly, the peeling off process is even more effective.

[0013] Preferably, the body carries the peeled off corner of the interleave paper from the bottom surface of the current upper plate towards the upper surface of the next plate, which may further facilitate the separation process.

[0014] By arranging the interleave paper remover for pressing the rotating body to the next plate's upper surface, said interleave paper may be clamped between the body and the next plate's upper surface. Then, the body may further counteract that a transferred printing plate accidently takes along an initial underlying interleave paper.

[0015] By providing the lifting unit with a plate gripper being pivotable for folding the current upper plate corner inwardly, the plate corner can be lifted relatively easily without shifting the current upper plate with respect to multiple plate stack.

[0016] The invention also relates to a method of handling a multiple plate stack formed by stacked printing plates provided with interleave papers sandwiched between subsequent printing plates.

[0017] Advantageous embodiments according to the invention are described in the appended claims.

[0018] By way of non-limiting example only, embodiments of the present invention will now be described with reference to the accompanying figures in which:

Figure 1 shows a schematic side view of an embodiment of a handling system according to the invention;

Figure 2 shows a schematic side view of the handling system of Fig. 1 during a first stage of a handling process;

Figure 3 shows a schematic side view of the handling system of Fig. 1 during a second stage of a handling process;

Figure 4 shows a schematic side view of the handling system of Fig. 1 during a third stage of a handling process;

Figure 5 shows a schematic side view of the handling system of Fig. 1 during a fourth stage of a handling process;

Figure 6 shows a schematic side view of the handling system of Fig. 1 during a fifth stage of a handling process;

Figure 7 shows a schematic side view of the handling system of Fig. 1 during a sixth stage of a handling process;

Figure 8 shows a schematic side view of the handling system of Fig. 1 during a seventh stage of a handling process, and

Figure 9 shows a schematic side view of the handling system of Fig. 1 during a eighth stage of a handling process.

[0019] The embodiments disclosed herein are shown as examples only and should by no means be understood as limiting the scope of the claimed invention in any way. In this description and in the figures, the same or similar elements have the same or similar reference signs.

[0020] It is noted that in this description a interleave paper has to be understood as at least including but not necessarily limited to a paper sheet, such as a glassine sheet, a plastic sheet or a multilayered sheet.

[0021] Figure 1 shows a schematic side view of an embodiment of a handling system 1 according to the invention, for transferring printing plates 2 from a multiple plate stack 3 to an imaging system 4 for performing a computer-to-plate imaging process on the printing plates 2. The imaging system 4 may for instance comprise transporting means 4t for transporting the printing plate and a radiation exposing unit 4r for radiating the printing plate 2. It is noted that he multiple plate stack 3 is formed by stacked printing plates 2 provided with interleave papers 6 sandwiched between subsequent printing plates 2a,b,c. The handling system 1 comprises a printing plate loader 5 for moving an initial upper plate 2a of a multiple plate stack 3 to an imaging system 4, preferably to an input section 4i of the imaging system. The initial upper plate 2a is generally a first plate to be processed. Further, the handling system 1 comprises an interleave paper remover 7. The interleave paper remover 7 comprises a lifting unit 8 for lifting a corner 2b' of a plate 2b that is at a particular instant in the upper position on the stack after removal of the initial upper plate 2a by the printing plate loader. It is noted that the corner can be understood as to be at least the surface area of the plate located nearby a tip of said plate. The interleave paper remover 7 further comprises a rotating body 9 provided with a running surface 9s comprising high frictional material, such as a material including natural and/or synthetic rubber. The body 9 can be provided with non-shown driving means, such as a motor, e.g. an electromotor. Further, the body 9 is insertable into a gap formed between the lifted plate corner 2b' and a next underlying plate 2c, and is rotatable around an axis 9a substantially parallel to an upper surface 2c" of the next plate 2c, such that the running surface 9s at a body side 9b facing the next plate's upper surface 2c" moves from the gap outwardly. It is noted that the axis 9a of the rotating body 9 can for instance be substantially parallel with an edge of the next printing plate. Alternatively, the axis 9a of the rotating body 9 can for example be substantially transverse or parallel with respect to a diagonal of the next plate 2c.

[0022] In the shown embodiment, the interleave paper remover 7 comprises two further rotating bodies 10 being

provided with a running surface 10s comprising high frictional material, the further rotating bodies 10 being insertable into the gap and being rotatable, such that the rotating axes 10a of the bodies are substantially parallel. Preferably, the rotating axes 10a of the further bodies are substantially parallel with the rotating axis 9a of the first rotating body 9. Although three bodies 9, 10 are shown, the interleave paper remover 7 may alternatively comprise more or less than three bodies. For example, one body 9 and no further bodies 10, or two, four or five rotating bodies 9, 10 in total.

[0023] Here, each of the bodies 9, 10 is formed by a wheel 9, 10. However, a single body 9, 10 or a multiplicity of the bodies 9, 10 can be formed differently, e.g. by a roll, a mill wheel or a cone. It is noted that the bodies may all have similar sizes, e.g. a similar roll/ wheel diameter and or a similar roll length/ wheel width, but can alternatively have differing sizes. Further, the axes 9a, 10a of the further bodies 10 are preferably substantially parallel to each other and/or to the axis 9a of the first rotating body 9. Here, all of said axes 9a, 10a are substantially located in one plane substantially parallel with the next plate's upper surface 2c" and are offset with respect to each other to such extent that the bodies are located straight behind each other. Alternatively, a single or multiplicity of the axes 9a, 10a can be located offset from said plane. Additionally or alternatively, a single or a multiple number of the bodies can, seen in the axial direction, be located in extension of each other. For instance, a multiple number of wheels is provided next to each other. Further, in principle, each of the wheels 9, 10 can be rotatably driven, e.g. by coupling with a motor.

[0024] Figure 2 shows a schematic side view of the handling system 1 of Fig. 1 during a first stage of a handling process. After the printing plate loader 5 lifted an initial upper plate 2a in order to transfer said plate 2a to the input section 4i of the imaging system 4, the lifting unit 8 lifts a corner 2b' of a printing plate 2b that is currently in the upper position on the multiple plate stack 3. Thereby a gap 11 is formed between the lifted plate corner 2b' and the next, underlying printing plate 2c on the stack 3. Here, the interleave paper 6b, initially located between the current upper printing plate 2b and the next plate 2c, may stick to the bottom side 2b" of the lifted plate corner 2b'. It is noted that, alternatively, the interleave paper does not stick to the lifted plate corner 2b', but floats between the two upper printing plates 2b,c.

[0025] Preferably, the lifting unit 8 comprises a plate gripper 12 for gripping, and later on releasing, the printing plate corner 2b'. In an advantageous embodiment, the gripper 12 comprises a suction cup 12, or so called vacuum loader. Alternatively or additionally, the gripper can comprise other gripping means, such as an electromagnet. Advantageously, the plate gripper 12 may be pivotable, e.g. around a pivot or ball- and- socket joint 12b, for folding the current upper plate corner 2b' inwardly. In this context, inwardly will at least be understood as in a direction substantially towards a central portion 2z of the current upper plate 2b and/or substantially towards a central axis 3a of the stack 3. It is noted that the pivot of the gripper can also be provided between other portions of the lifting unit.

[0026] Figure 3 shows a schematic side view of the handling system 1 of Fig. 1 during a second stage of a handling process. Here, the rotating body 9 is inserted into the gap 11. The insertion can take place after or partly during lifting the plate corner 2b'.

[0027] Figure 4 shows a schematic side view of the handling system 1 of Fig. 1 during a third stage of a handling process. In the gap 11, the sticking interleave paper 6b is peeled off from the lower surface 2b" of the current upper printing plate. Here, the peeling is done by pressing the first rotating body 9 against said interleave paper 6b while rotating said body 9 around its axis 9a, such that the running surface 9s at the body side 9b facing the next plate's upper surface 2c" moves in an direction D1 outward from the gap 11, which in the shown view is directed to the right. This is, in Fig. 4 the first body 9 is rotating in a counterclockwise direction C. Since the body 9 is rotating, the top side of the body 9t, here facing the sticking interleave paper 6b, moves in a substantially opposite direction D2, thus into the gap. This inward direction D2 of the body's top side 9t, which direction is in the shown view directed to the left side of Fig.4, can be substantially directed towards the central axis 3a of the multiple plate stack 3.

[0028] Due to friction between the running surface 9s and the lower side 6b" of the interleave paper, the rotating body 9 peels off said paper and carries the peeled off corner 6b' of the interleave paper towards the upper surface 2c" of the next plate 2c.

[0029] In this respect it is noted that instead of the rotating body 9, more generally, a body can be applied that is provided with a running surface comprising high frictional material, the body being insertable into a gap formed between the lifted plate corner and a next plate, the body further being arranged for frictionally contacting an interleave paper 6b sticking to a lower surface 2b" of the upper plate 2b, so as to peel off the interleave paper 6b from the upper plate 2b. Generally, the high frictional material on the running surface generates a frictionally contacting effect when touching, gripping an interleave paper that sticks to the lower surface of the upper plate. In a specific embodiment, the body is rotationally fixed. Then, the friction can be exerted during the process of inserting the body into the gap 11. The body is not rotationally driven. In another specific embodiment, the body is rotatable with respect to the above-mentioned axis 9a, but in only one rotation direction, in Figs. 3 and 4 in the counterclockwise direction C, e.g. including a one-way clutch. Then, the friction can be exerted during the process of inserting the body into the gap 11 and/or during rotation of the body. Depending on a particular design, the rotating body is actively driven using a driving means, or, alternatively, the rotating body is passive, not provided with a driving means. Further, the body can rotate in op-

posite rotating directions. Preferably, the rotating body is then actively driven to generate the frictionally contacting effect.

[0030] Figure 5 shows a schematic side view of the handling system 1 of Fig. 1 during a fourth stage of a handling process. The peeled off paper being carried towards the next plate 2c, is also at least partly carried outwardly from the gap 11. In the shown embodiment, the interleave paper remover 7 is arranged for pressing the rotating body 9 to the next plate's upper surface 2c". Here, a frame 13 carrying said body 9 and the further bodies 10, is pressed downwards in order to clamp the peeled off paper 6b' between the first body 9 and the next plate's upper surface 2c" to such extent that the surface 9s of the first rotating body 9 can exert enough friction force to said paper 6b' to carry it from the gap 11 in the outward direction D1. Although the peeled off interleave paper 9b' is shown in a folded position, the high frictional running surface 9s may be arranged for carrying the interleave paper when it is wrinkled, e.g. due to the peeling action.

[0031] It is noted that even if the interleave paper 6b did initially not stick to the current upper plate's corner 2b', but keeps lying on the next plate 2c, the rotating body 9 can press the interleave paper 6b to said next plate 2c and can prevent that the upper plate 2b takes along said paper when the upper plate 2b is transferred to the imaging system 4.

[0032] Preferably, the peeled off paper 6b' is carried towards below the rotating body 9 before said body 9 is pushed towards the next plate 2c. In an advantageous embodiment, the handling system 1 may comprise a sensor, such as an optic sensor, for detecting that at least a part of the peeled of paper is carried between the first body 9 and the next plate's upper surface 2c". Further, the handling system 1 may comprise a processor for controlling the rotating body based on information provided by said sensor or by a timer or other measurement means. Moreover, the handling system 1 may comprise other means, such as a single or a multiple number of sensors, e.g. for detecting the location of the corner of the current upper plate, the size of the gap 11, the distance that the first body 9 is inserted into the gap, the pressure force exerted by the first body 9 onto the interleave paper, etcetera. Further, the handling system 1 and/or the processor may be arranged to control the first and/or further rotating bodies, lifting unit 8 and/or gripper 12 based on information detected by said other means.

[0033] It is noted that, the further bodies 10 are in the shown embodiment inserted into the gap 11 together with the first rotating body 9, see Fig. 3. However, the further bodies 10 may alternatively be inserted in a later stage, e.g. the third or fourth shown stage shown in Fig. 4 or Fig. 5, respectively, for instance when these are supported by the same frame 13.

[0034] Figure 6 shows a schematic side view of the handling system 1 of Fig. 1 during a fifth stage of a handling process, in which the peeled off corner 6b' of the interleave paper is shifted from the gap 11 outwardly. In the shown embodiment, the first and the further rotating bodies 9, 10 work together to slide the interleave paper out of the stack 3. However, in alternative embodiments a single or a multiple number of the bodies, e.g. the further bodies 10, may be arranged for pushing the peeled interleave paper against the upper surface of the next plate 2c and/or for shifting said paper from the gap outwardly, while on the other hand a single or a multiple number of the bodies, e.g. the first rotating body 9, may be arranged for peeling off and/or carrying the corner of the interleave paper towards the upper surface of the next plate. Here, the first body 9 can peel off the interleave paper, carry it downwards and press it to the underlying next plate 2c, and the first body 9 and the further bodies 10 can together pull the part 6b" of the interleave paper clamped between the current upper printing plate 2b and the next plate 2c out from between said plates and can push the interleave paper out of the stack. Further, the plate gripper 12 releases the upper plate corner 2b', so that the plate upper plate corner 2b' lies on the rotating body 9 and the further bodies 10. The process of releasing the upper plate corner 2b' may take place before, during and/or after the operation of shifting the interleave paper 6b' from the gap 11 outwardly.

[0035] Figure 7 shows a schematic side view of the handling system 1 of Fig. 1 during a sixth stage of a handling process. In the shown embodiment, the lifting unit 8 is arranged for moving the plate gripper 12 between an operating position for lifting the corner of the current upper plate, such as the position shown in Fig. 2-6, and a rest position away from the plate stack 3, such as shown in Fig. 1 and 7. Here, as best can be seen in Fig. 1, the plate gripper 12 is shiftable in a direction substantially parallel with the plates 2 of the multiple plate stack 3, e.g. in a horizontal direction. Additionally or alternatively, the plate gripper 12 can be shiftable in a direction substantially transverse to the stacked plates 2, e.g. in a vertical direction.

[0036] In the shown sixth stage of Fig. 7, the upper printing plate 2b is lifted from the stack 3 using the printing plate loader 5 described above referring to Fig. 1. The plate 2b is then moved to the image system 4. The plate gripper 12 being now located in its rest position is not obstructive when the plate loader 5 moves the current upper printing plate 2b to the imaging system 4.

[0037] Figure 8 shows a schematic side view of the handling system 1 of Fig. 1 during a seventh stage of a handling process. Here, the rotating bodies 9, 10 have been withdrawn from the stack 3.

[0038] Figure 9 shows a schematic side view of the handling system 1 of Fig. 1 during a eighth stage of a handling process. Now, the intermediate paper 6b is removed by a paper gripping unit 100 as described in more detail in European patent publication in the name of the applicant EP 1 862 413. The paper gripping unit comprises a first friction wheel 105 and a second friction wheel 102, arranged in parallel with the first friction wheel

105. The gripping unit 100 further comprises an actuator 112 on which the first friction wheel 105 is mounted via a connection member 111 that is preferably adjustable, e.g. using pneumatic cylinders, for moving the first friction wheel 105 towards the second friction wheel 102. In addition, the first friction wheel 105 is arranged to rotate with respect to its axis during the movement towards the second friction wheel 102 such that the intermediate paper 6b on which the first wheel 105 exerts the friction force is forced into the direction of the second friction wheel 105.

[0039] To that end the rotation of the first friction wheel 105 is caused by the actuator 112 for moving the first friction wheel 105 towards the second friction wheel 102. In particular, the first friction wheel 105 is driven by a tooth wheel transmission. Apparently, other transmission systems could also be applied, such as a belt transmission. The first friction wheel 105 is fixedly provided with a gear wheel 113 cooperating with a gear rack 114 that is fixed with respect to the axle of the second friction wheel 102. By the action of the first friction wheel 5, the intermediate paper 6b folds and is clamped between the first and second friction wheels 105, 102.

[0040] It is noted that the intermediate paper 6b can also be removed in another way, e.g. using a separate device provided with a suction cup. Alternatively, the interleave paper remover 7 can remove the interleave paper 6b using above described elements, such as the rotating bodies 9, 10 and/or the suction cup 12.

[0041] In a similar way as the six stages described above, the interleave paper remover 7 can remove a next interleave paper 6c from the bottom side of the next printing plate 2c, preferably at least simultaneously with the transferring of the previous plate 2b by the plate loader 5, thereby speeding up the printing plate transferring process.

[0042] It is noted that according to an alternative embodiment of the invention, the rotating body 9 may stop rotating, after the interleave paper is peeled off and is pressed against the top surface of the next plate 2c. Then, the printing plate loader 5 removes the upper plate 2b while the rotating body 9 keeps pressing down on the interleave paper 6. It is noted that, in principle, the lifting unit 8 can release the lifted plate corner 2b' before the plate loader 5 grips the plate 2b, or before the plate loader 5 starts lifting the plate, or even after the plate loader 5 starts lifting the plate 2b, e.g. during transfer of the printing plate 2b to the imaging system 4. Subsequently, the rotating body 9 may shift the then uncovered interleave paper 6b, after which the interleave paper remover 7 may start the separation process of the next interleave paper 6c, e.g. starting with lifting the corner of the next plate 2c.

[0043] According to an aspect of the invention, there is provided a method of handling a multiple plate stack formed by stacked printing plates provided with interleave papers sandwiched between subsequent printing plates. The method comprises the steps of lifting a corner of a printing plate that is in the upper position on a multiple plate stack, thereby forming a gap between the lifted plate corner and a next printing plate on the stack; and peeling off, in the gap, an interleave paper from the lower surface of the upper printing plate.

[0044] In an advantageous embodiment the method can further comprise the step of carrying the peeled off corner of the interleave paper towards the upper surface of the next plate.

[0045] In a very advantageous embodiment, the method comprises the steps of:

- lifting a corner of an upper printing plate from a stack of printing plates including interleave papers sandwiched between subsequent printing plates,
- folding the upper printing plate corner inwardly,
- peeling off an interleave paper from the lower surface of the upper printing plate,
- pushing the peeled off corner fo the interleave paper against the upper surface of the next, underlying printing plate, and
- removing the upper printing plate.

[0046] Then, a time- efficient, effective and reliable separation of the interleave paper is obtained.

[0047] Further, the method may comprise the step of shifting the peeled off corner of the interleave paper from the gap outwardly.

[0048] It will be understood that the above described embodiments of the invention are exemplary only and that other embodiments are possible without departing from the scope of the present invention. It will be understood that many variants are possible.

[0049] As an example, the frictional material of the running surface 9s of the rotating body 9 can be provided as an outer layer of the body, and may for instance be a coated layer. As another example, the rotating body 9 and its running surface can be formed as an integral part, e.g. as a rubber disc. Further, the running surface 9s may for instance be formed as a smooth surface, or so called slick tread. Alternatively, the running surface 9s may comprise a tread pattern, e.g. the running surface 9s may include grooves.

[0050] Such variants will be apparent to the person skilled in the art and are considered to fall within the scope of the invention as defined in the following claims.

Claims

1. A handling system for transferring printing plates from a multiple plate stack to an imaging system for performing a computer-to-plate imaging process on the printing plates, comprising:

   a printing plate loader for moving an upper plate of a multiple plate stack to an imaging system, the multiple plate stack being formed by stacked printing plates provided with interleave papers

sandwiched between subsequent printing plates; and
an interleave paper remover, wherein the interleave paper remover comprises:

a lifting unit for lifting a corner of a plate that is in the upper position on the stack; and
a body provided with a running surface comprising high frictional material, the body being insertable into a gap formed between the lifted plate corner and a next plate, the body further being arranged for frictionally contacting an interleave paper sticking to a lower surface of the upper plate, so as to peel off the interleave paper from the upper plate.

2. A handling system according to claim 1, wherein the body provided with a running surface is rotatable, at least in one rotation direction, around an axis substantially parallel to an upper surface of the next plate.

3. A handling system according to claim 1 or 2, wherein the rotating body is formed by a wheel or a roll.

4. A handling system according to any of the preceding claims, wherein the interleave paper remover comprises a multiple number of bodies being provided with a running surface comprising high frictional material, the bodies being insertable into the gap for frictionally contacting an interleave paper sticking to a lower surface of the upper plate, so as to peel off the interleave paper from the upper plate.

5. A handling system according to any one of the preceding claims, wherein the interleave paper remover is arranged for pressing the rotating body to the next plate's upper surface.

6. A handling system according to any one of the preceding claims, wherein the lifting unit comprises a plate gripper.

7. A handling system according to claim 6, wherein the plate gripper comprises a suction cup.

8. A handling system according to claim 6 or 7, wherein the lifting unit is arranged for moving the plate gripper between an operating position for lifting the corner of the upper plate and a rest position away from the plate stack.

9. A handling system according to claim 6, 7 or 8, wherein the plate gripper is pivotable for folding the upper plate corner inwardly.

10. A method of handling a multiple plate stack formed by stacked printing plates provided with interleave papers sandwiched between subsequent printing plates, comprising the steps of:

lifting a corner of a printing plate that is in the upper position on a multiple plate stack, thereby forming a gap between the lifted plate corner and a next printing plate on the stack; and
peeling off, in the gap, an interleave paper from the lower surface of the upper printing plate.

11. A method according to claim 10, further comprising the step of carrying the peeled off corner of the interleave paper towards the upper surface of the next plate.

12. A method according to claim 10 or 11, further comprising the step of pushing the peeled off corner of the interleave paper against the upper surface of the next plate.

13. A method according to claim 10, 11 or 12, further comprising the step of shifting the peeled off corner of the interleave paper from the gap outwardly.

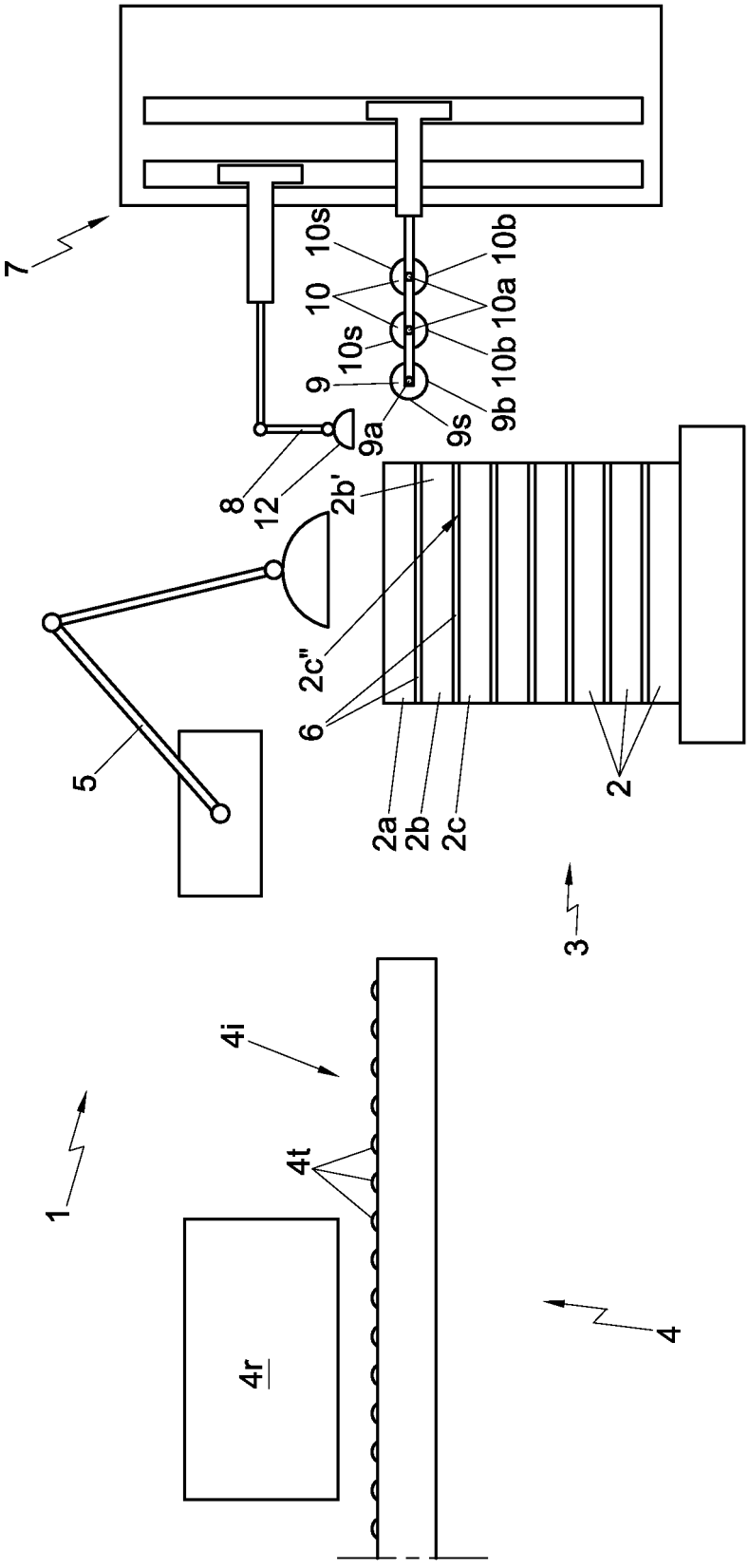
7
10s
10
10a
10b
9
10s
9b
10b
9s
9a
8
12
2b'
2c"
6
5
2a
2b
2c
2
3
4i
4t
1
4r
4

Fig. 1

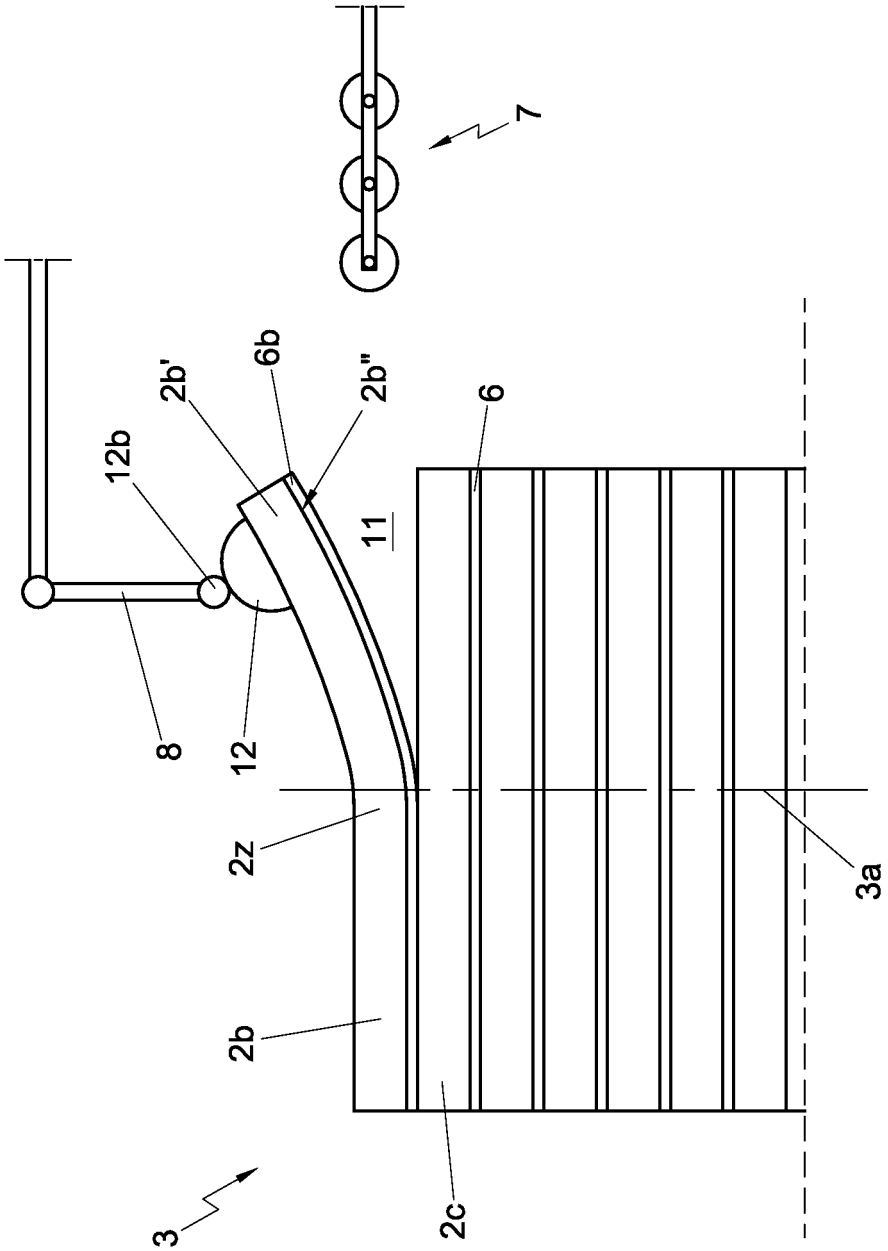

Fig. 2

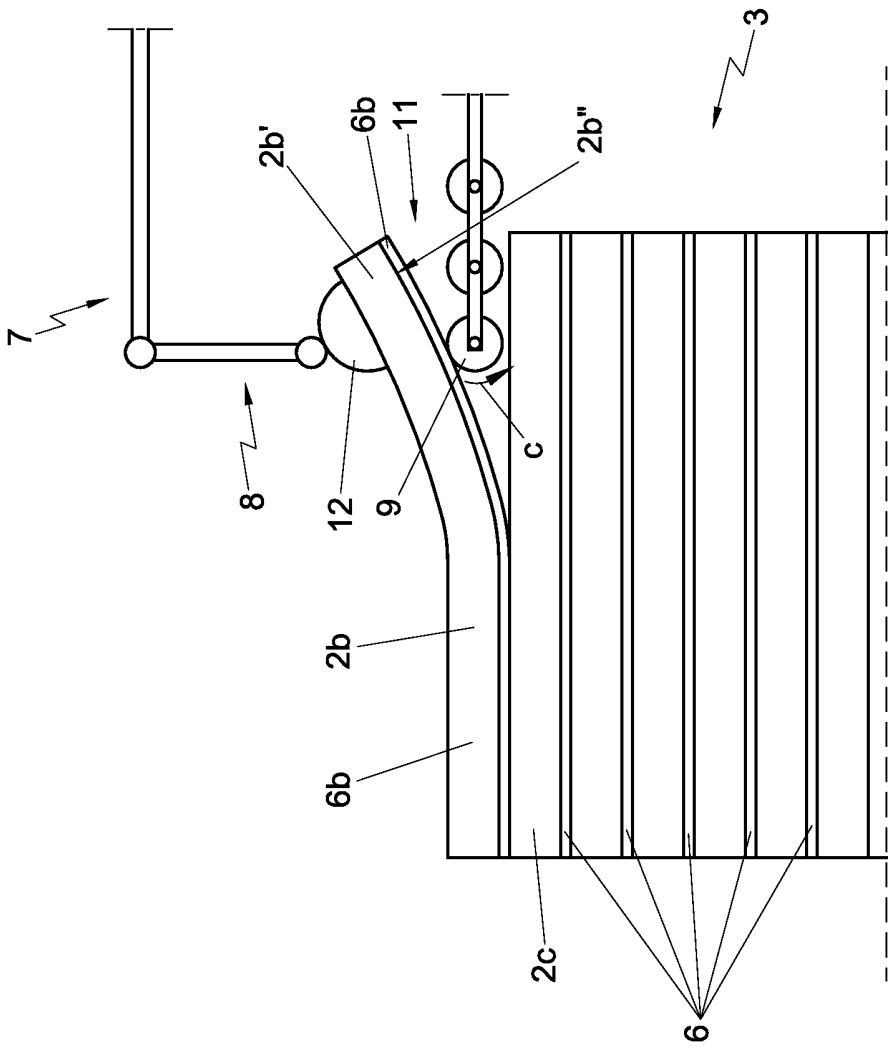

Fig. 3

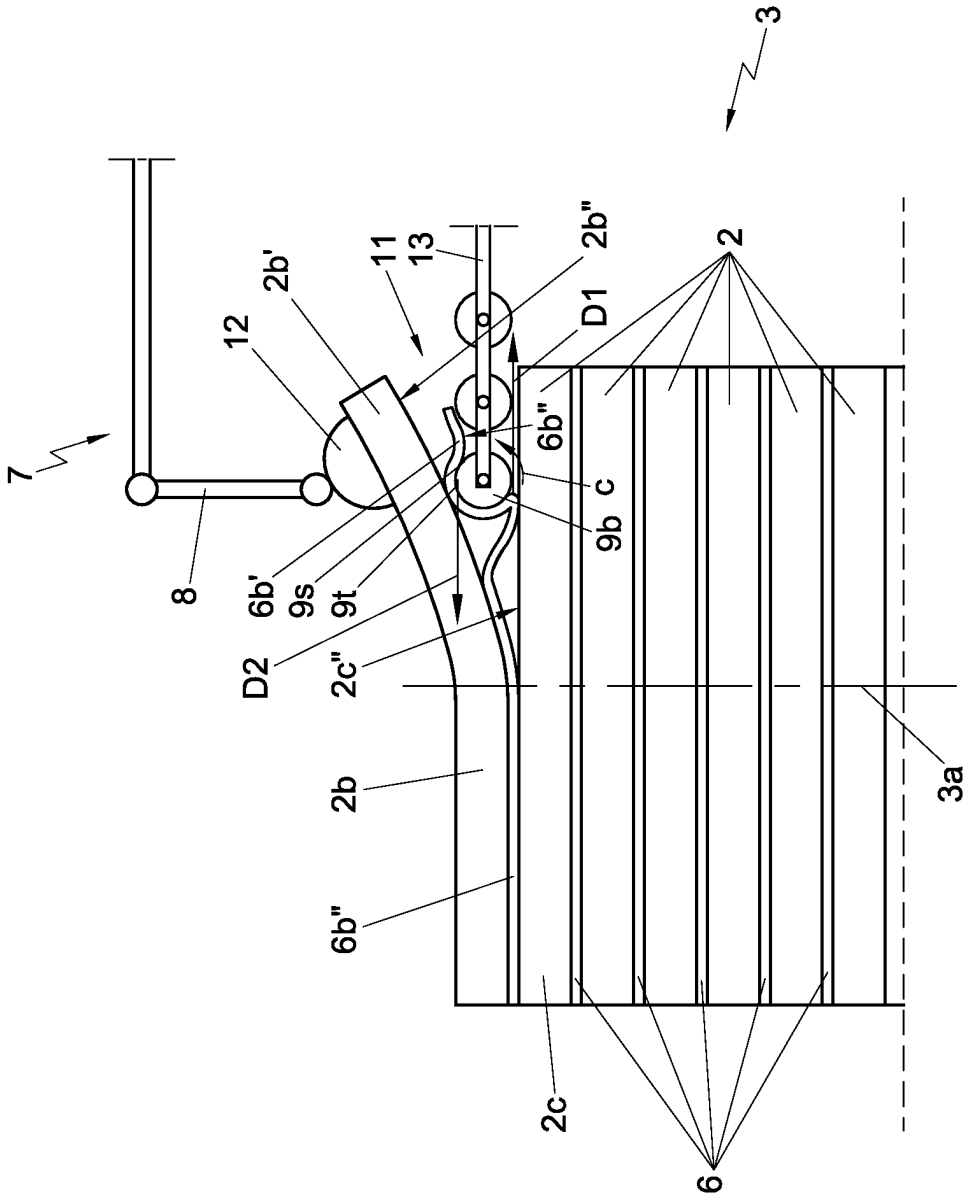

Fig. 4

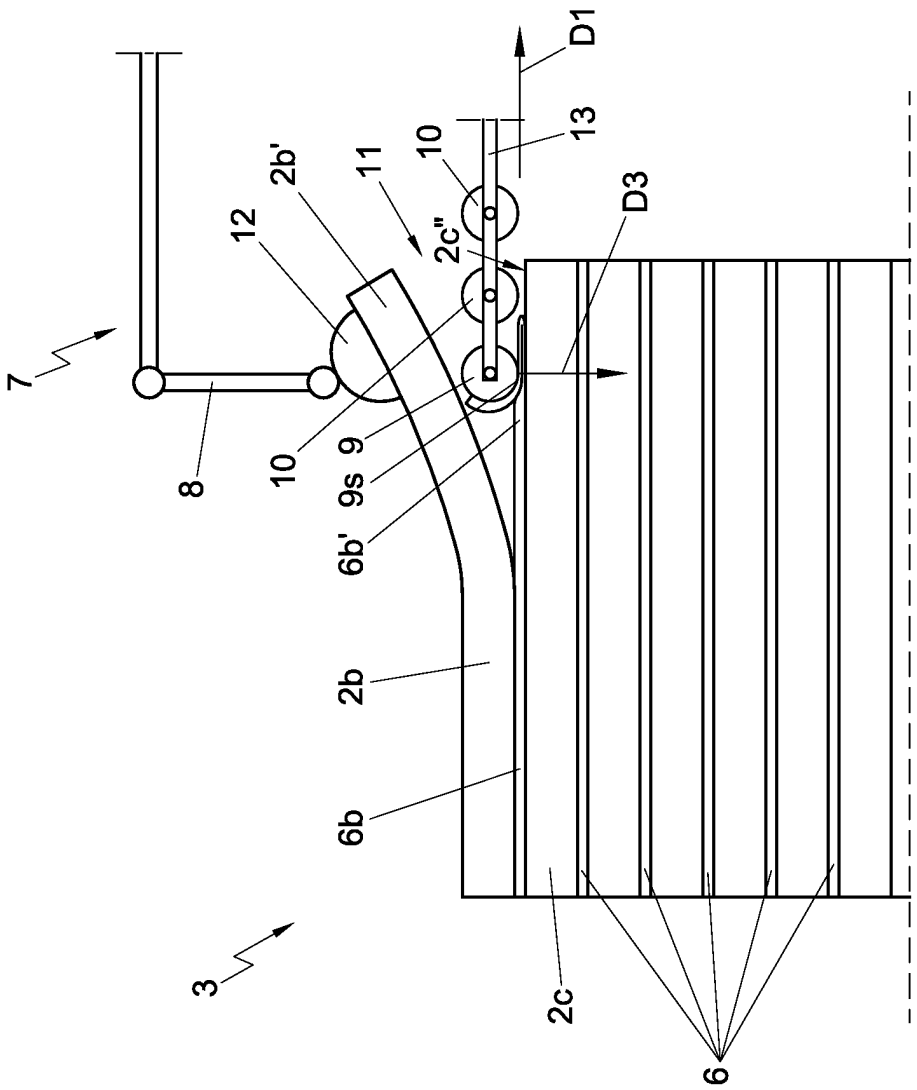

Fig. 5

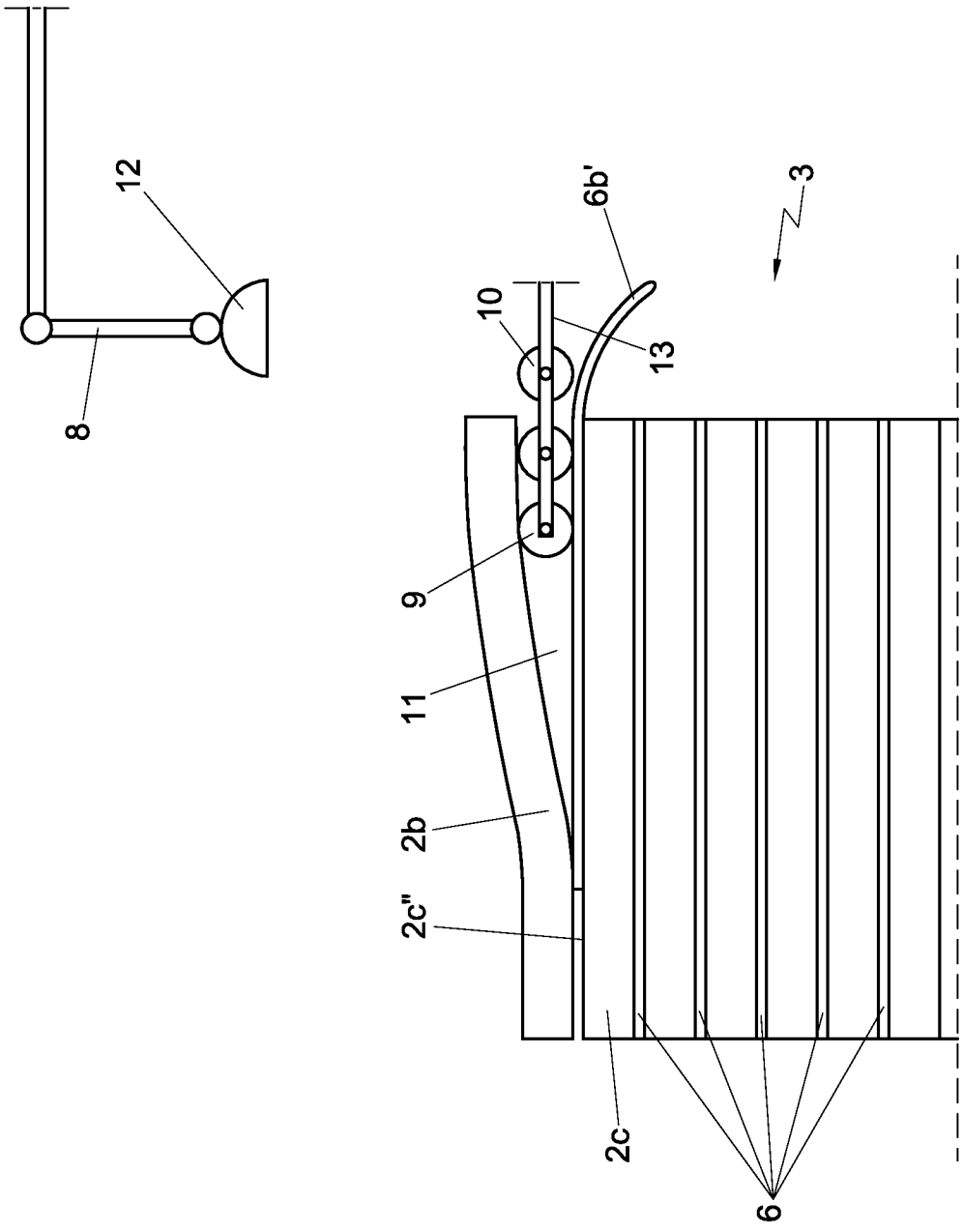

Fig. 6

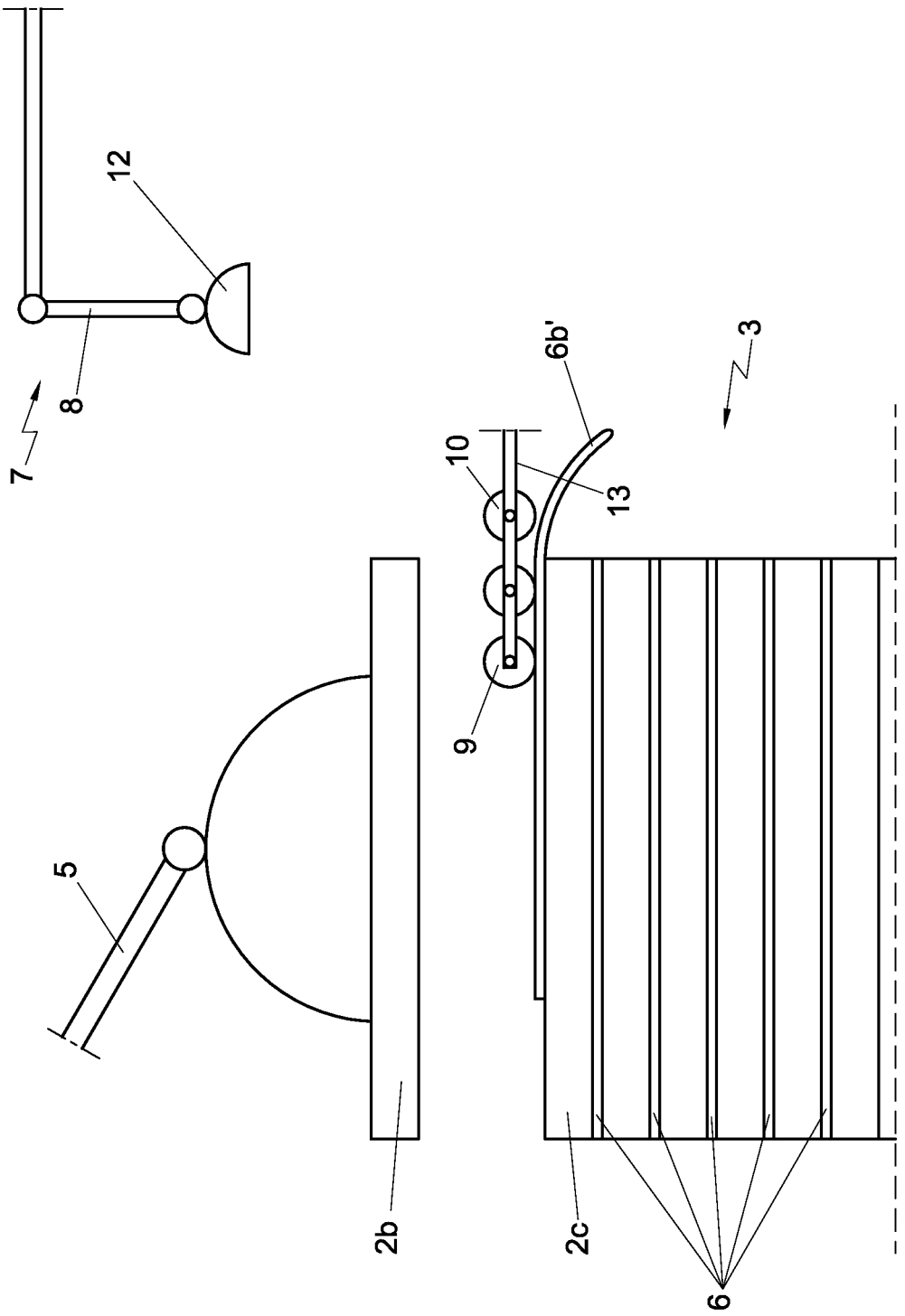

Fig. 7

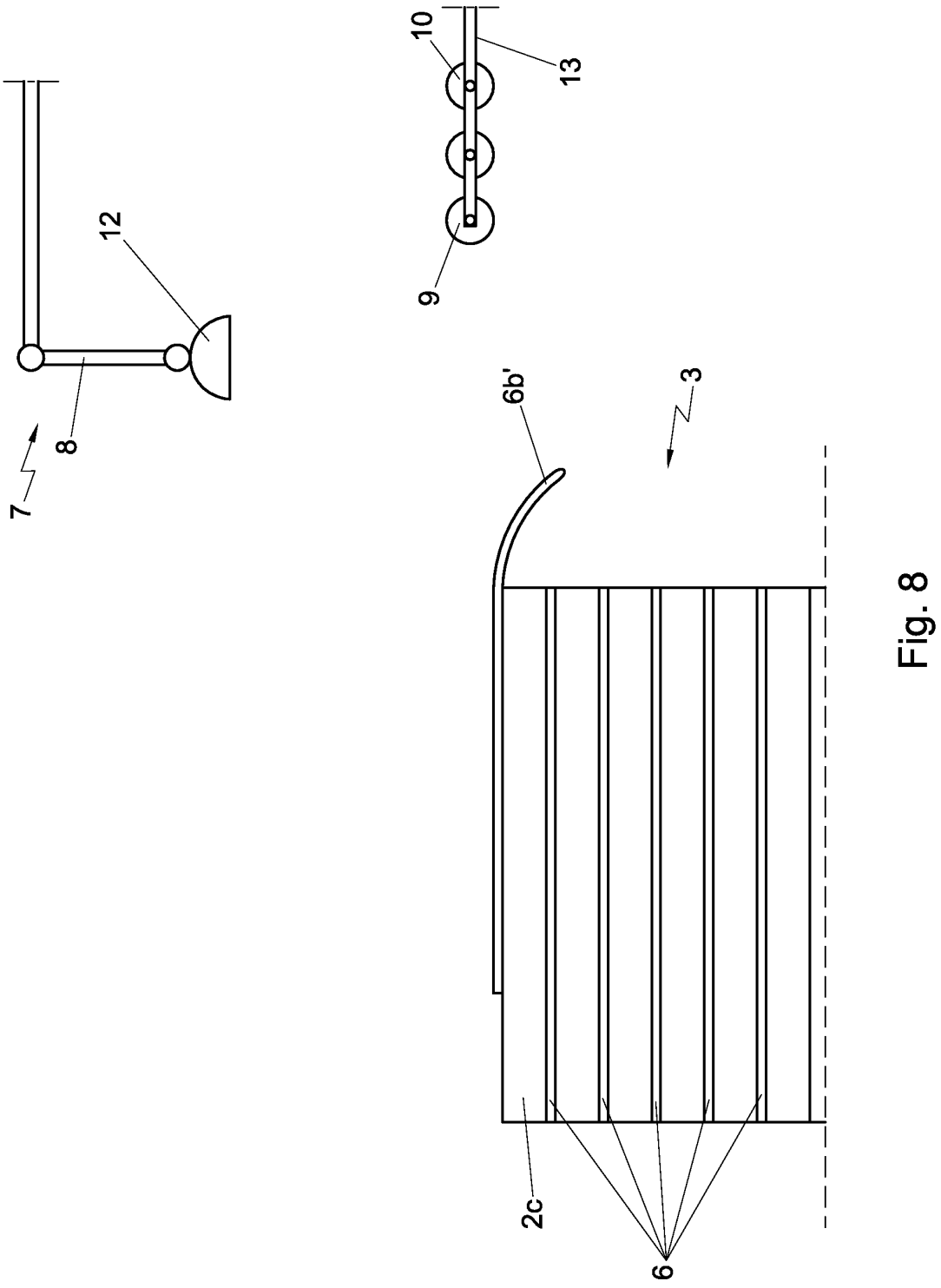

Fig. 8

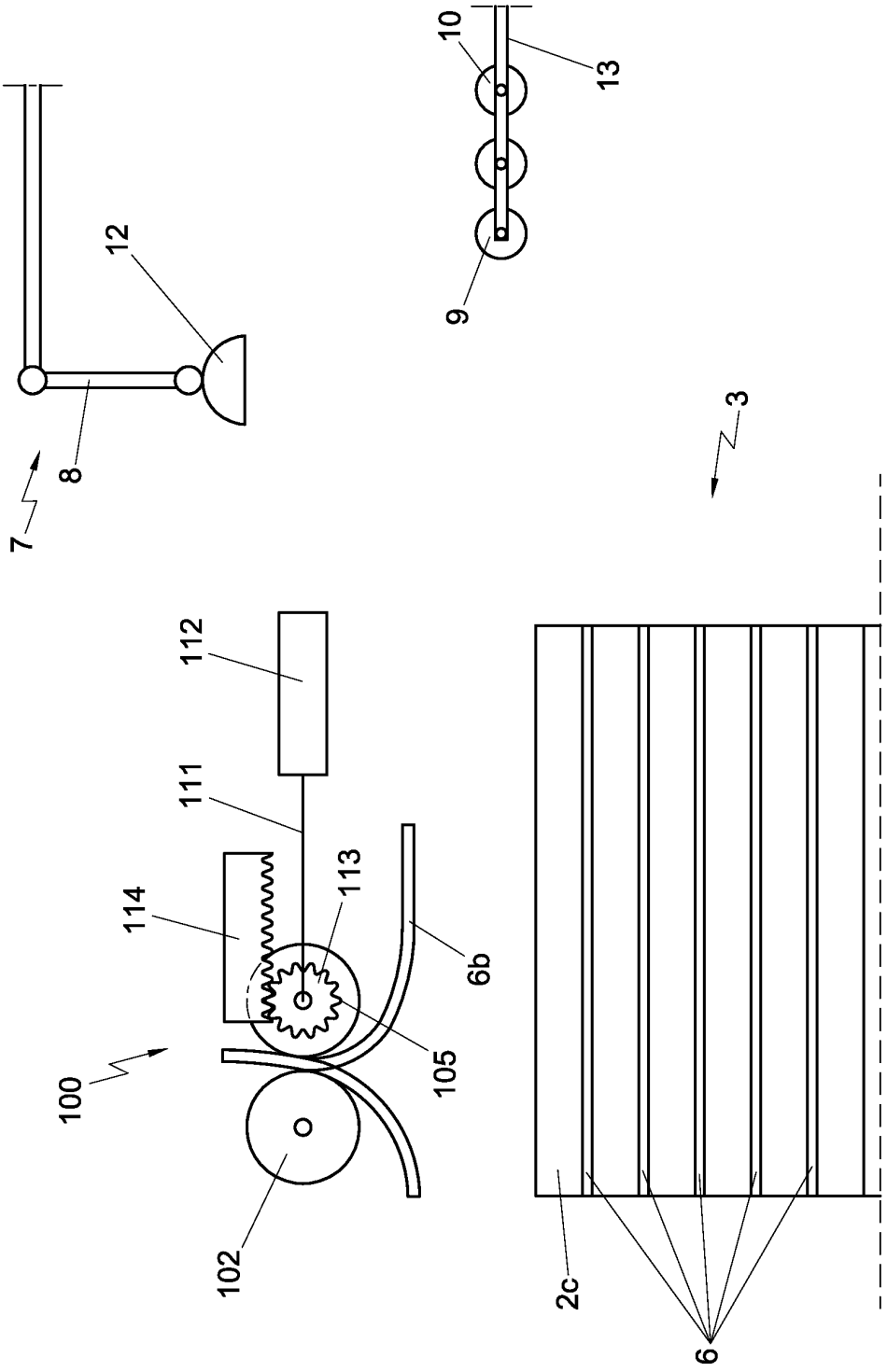

Fig. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 12 16 4743

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TECHNICAL FIELDS SEARCHED (IPC)

B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 September 2012	Athanasiadis, A

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