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PRINTING PRESS WITH SHEET TRANSFER TABLE

The invention relates to a sheet fed printing press having a sheet transfer table.

In order to change from a broader to a narrower paper size of sheets that are to be printed in a sheet-fed printing press, it is known to adjust side lays in their lateral position to the new paper size that is to be printed. From EP 0 268 693 B1 it is known, for the purpose of infinitely variable size adjustment, to provide U- or V-shaped sheet-guiding spring elements between the side lays and a table plate covering the centre of the table. When the paper size is being reduced, the side lay - against the spring action of the juxtaposed spring elements - compresses said spring elements with there being a reduction in the angles produced by the legs of the spring elements. When the side lay is changed over to a larger paper size, the angles open owing to the restoring force of the spring elements; the juxtaposed spring elements, forming the table cover, can be compressed at most to the block length - forming the basis for the row of spring elements - between side lay and the plate covering the centre of the table. The smallest possible paper-size setting is thus additionally limited in undesired manner by the block length. As a result of the lengthening of the spring elements in the sheet-conveying direction when the side lay is set to a smaller paper size and as a result of their shortening when the side lay is set to a larger paper size, there are, moreover, gaps between the spring elements and the pre- and post-positioned table tops, said gaps being pre- and post-positioned

with respect to the spring elements in the sheet-conveying direction, transverse to the sheet-conveying direction, in order to effect the change in length of the spring elements, with the size of said gaps varying depending on the paper-size setting. Particularly in the case of large paper-size widths, said gaps represent so-called stumbling places for the conveyed paper sheets. Reliable guiding of the sheets cannot be guaranteed with spring elements according to EP 0 268 693 B1. Moreover, such a table cover allows the easy transmission of undesired particles through the table cover. Between the legs of the spring elements it is very easy for lubricants and rubbed-off particles from the gear-drive region below the table top to get onto the paper sheets; likewise, it is possible for paper dust and similar particles that may possibly adhere to the paper sheets to get into the gear-drive below the table top, for example into the side-lay gear drive. Both phenomena have an adverse effect on the reliable guiding of the sheets.

Known from US-PS 3,227,443 is a table cover in the region of the side lays, in which juxtaposed table-top elements are disclosed, said table-top elements being interconnected in articulated manner, with a first element of the table-top elements that form the row being connected to a side lay. The row of table-top elements are displaceably guided perpendicularly to the sheet-conveying direction. When the paper size is reduced, the row of individual table-top elements is displaced towards the centre of the table with the aid of the side lay. The table-top elements are deflected by the guides, in the region of the table plate covering the centre of the table, under said table plate, where they are displaced further, parallel to said table

plate, towards the centre of the table. Here too, an adjustment from a very large paper-sheet size to a very small paper-sheet size is possible only to a very limited extent. In order to obtain the smallest possible paper-size setting with such a table cover, it is necessary for the table plate covering the centre to be so widely dimensioned that the row of table-top elements can be displaced more or less completely under said table plate. In order to change to as a large a paper-sheet size as possible, however, it is advantageous with such a table cover to make the row of table-top elements as long as possible. Making said row of elements as long as possible, on the one hand, coupled with the requirement for the row of elements to be covered as accurately as possible, on the other, by the table plate that covers the centre, means that a setting to a very small sheet size is not possible with such a table cover, given a realistic desired maximum sheet size.

The object of the invention, therefore, is to provide a printing press having a table which provides reliable guiding of the sheets in the region of the side lay, and also to permit infinitely variable sheet-size adjustment.

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According to the present invention, we provide a sheet fed printing press having a table on an upper surface of which sheets are transported between two side lays to at least one front stop, wherein the distance between the side lays
10 transverse to the transport direction of the sheets is adjustable to accommodate sheets of different widths, wherein the table surface has, at a longitudinal location corresponding with that of the side lays, at least one elongate, transversely extending gap, part of which is
15 occupied by one of said side lays to permit transverse positional adjustment of the side lay for different sheet widths, that or those parts of the gap on one or both sides of the side lay being covered by a portion or portions of a flexible sheet support member, regardless of the transverse
20 position of the side lay.

With such a construction, the flexible sheet support member forming part of the table surface makes way for the side lay. The table surface covering the centre of the table can
25 thus be dimensioned irrespective of the desired sheet-size variation range. Since the surface forming the table cover is continuous and makes way for the side lay and not for the table surface that covers the centre of the table, as is the teaching of U.S. 3227443, it is possible for the table
30 surface that forms the centre of the table, for example a table plate or a suction belt, to be made very small. The continuous surface may be designed for a very large sheet-size variation range. Stumbling places for the conveyed sheets are very extensively prevented with such a table
35 cover.

Preferably, the sheet support member is a one-piece flexible surface, and means are provided for guiding the flexible

surface round the side lay, which makes it possible to reduce the risk of stumbling places transverse to the sheet-conveying direction.

- 5 Preferably, the flexible surface is a transverse belt of metal or fabric.

The flexible belt may be attached by one belt end to the feed table in the region of the centre of the table, and by
10 its other belt end to a side frame of the printing-press and means for guiding the flexible belt are disposed on the side lay. Alternatively, one end of the flexible belt may be attached to the side lay at the side pointing from the side lay towards the centre of the table, and the other end is
15 attached at the side of the side lay pointing away from the centre of the table, and means for guiding the flexible belt are provided in a side frame of the printing press and in the region of the centre of the table.

- 20 By making the belt in the form of a means for displacement measurement for setting and/or determining the position of the side lay, it is possible in particularly simple manner to obtain precise positioning of the side lay to the desired position and thus to improve the infinitely variable sheet-
25 size adjustment.

The flexible belt may be in the form of an actuating means for adjusting the side lay. This makes it possible to obtain the adjustment of the side lay to an infinitely
30 variable desired position using simple means without additional actuating means.

By making the belt surface a closed surface, the transmission of particles through the table cover, which
35 impede the reliable guiding of the sheets, is to a very large extent prevented.

Two embodiments of the invention are now described by way of

example with reference to the accompanying drawings, in which:-

FIGURE 1 shows a top view of one embodiment of a table cover in a press in the region of the side lays with revolving belt and schematically represented side lays;

FIGURE 2 shows a sectional view along the line II-II of Figure 1;

FIGURE 3 shows a side view of a second embodiment of a table cover in a press with a belt fixed to the table;

FIGURE 4 is a section along the line IV-IV in Figure 2;

FIGURES 5a and 5b are schematic views of alternative arrangements, being of sections on the line V-V in Figure 2; and

FIGURE 6 is a view similar to Figures 5a and 5b, but is a section on the line VI-VI in Figure 3.

As shown in Figures 1 and 2, paper sheets (not shown) are transported from a pile (not shown) over a table top 2a, mounted in the side frames 4a and 4b of a sheet-fed printing press, by a moving suction belt 1 of conventional type between the side lays 5a and 5b across a pliable and tensionally rigid metal belt 7 preferably having a closed, i.e. non-perforated, surface. The paper sheets are laterally aligned in position at one of their side edges by a side lay 5a, 5b. Next, the suction belt 1 brings the paper sheets across a table top 2b up against schematically represented front stops 6, at which the sheets are aligned along their front edges. Having been aligned, the paper sheets are fed in conventional manner to the printing unit (not shown). The suction belt 1 is guided around guide rollers, of which, for reasons of clarity, merely the guide roller 3, post-positioned with respect to the side lay device, is schematically represented.

As is shown in Figure 4 by way of example, the side lay 5b consists of a side lay body 11 which is displaceable on a

guide shaft 12, attached in the printing press side frames 4a and 4b and extending transversely with respect to the sheet-conveying direction.

5 Furthermore, the side lay body 11 is held against longitudinal movement and transversely guided by means of a pad 24 sliding in a transversely extending slide rail 25 and attached to the table top 2b. A threaded adjusting spindle 13, which is held in the side frames 4a and 4b engages a
10 thread provided in the side lay body 11 is rotated to adjust the transverse position of the side lay body 11 and hence of the side lay 5b. A driving worm 16 is fixedly secured on a control shaft 14, which also extends transversely and is held in the side frames 4a and 4b, is rotatably driven in
15 conventional manner (not shown). A gearwheel 17 mounted on one end of a control shaft 18 held in the side lay body 11, meshes with the driving worm 16, and a drawing roller 19 is attached to the other end of the control shaft 18. An axial cam 15 which is secured against rotation, but is axially
20 displaceable on the control shaft 14 and is guided axially on the control shaft 14 by the side lay body 11, is in constant contact with a roller 21 rotatably supported on one arm of a bell crank lever 22. A dabber roller 20 is likewise rotatably held on the other arm of the bell crank
25 lever 22.

The paper sheets fed to the side lay 5 are, in conventional manner, triggered by the axial cam 15 via the lever 22, which acts on the top sides of the paper sheets, the bottom
30 sides of which are brought into contact with the drawing roller 19 which brings the sheets up against stops (not shown) provided on the side lay body 11.

As shown in Figures 1 and 2, the sheet guiding surface
35 between the table tops 2a and 2b on either side of the suction belt 1 is composed in each case of a flexible metal belt 7 entrained around a guide roller 8 in the respective side frame 4a or 4b and around two guide rollers 9, 10 held

in the table tops 2a and 2b. The two ends of the belt 7 are attached to the side lay body 11 under tensile pre-loading in the conveying plane at attachment points 35 and 36. When the side lay 5b is adjusted between the position 5b and 5b', as shown in Figure 2, the side lay 5b draws the belt 7 into the desired position.

Instead of adjusting the side lay 5b with the adjusting spindle 13, it is conceivable to connect the guide roller 8 to driving means, for example to a handwheel for manual driving or alternatively to electric or pneumatic driving means, and, by turning the guide roller 8, to adjust the side lay to the desired position via the supporting belt 7.

It is likewise possible for the metal belt 7 to be used for the precise determination of the position of the side lay 5. For this purpose it is conceivable, for example, to provide the metal belt 7 preferably on its underside with displacement measuring strips which are scanned by known displacement measuring sensors attached preferably to the side frames 4a and 4b. With the aid of evaluation electronics, it is then possible for there to be precise positional determination of the side lay.

In the embodiment of the invention shown in Figure 3, one end of a pliable tensionally rigid metal belt 27 is attached in the sheet conveying plane at 34 to the side frame 4b. The belt 27 extends towards the centre of the table, is deflected downwards around a guide roller 32 attached to the side lay body 11, is then guided round a further guide roller 31 attached to the side lay body 11 and around a guide plate 30 attached to the side lay body 11 around the side lay and is returned to the sheet conveying plane around a further guide roller 29 attached in the side lay body 11. The other end of the belt 27 is attached under tensile pre-load to an attachment point 33 on a projection 28 of the table top 2a or 2b.

The side lay 5 is transversely displaced in its position through rotation of the spindle 13. Between the attachment point 33 and the guide roller 29, on the one hand, and between the guide roller 32 and the attachment point 34, on the other, the metal belt 27 forms a flat surface in the sheet conveying plane at each position of the side lay.

Also with this embodiment, it is conceivable to provide the metal belt 27 with displacement measuring strips in order to determine the position of the side lay 5, said displacement measuring strips then being scanned by sensors attached to the side lay body 11. With the aid of evaluation electronics it is possible, once again, for the position of the side lay to be accurately determined.

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As shown in Figure 5a, the supporting belt 7 may rest in the sheet conveying direction both on a projection of the table top 2a and also on a projection of the table top 2b. The sheet guiding surface of the table top 2a should be disposed slightly above the sheet guiding surface of the metal belt 7 and the sheet guiding surface of the metal belt 7 should be disposed slightly above the sheet guiding surface of the table top 2b.

25 It is also conceivable for the metal belt 7 to rest merely on a projection of the table top 2b, as shown in Figure 5b.

In the second embodiment, the metal belt 27, as shown in Figure 6, may not rest on either of the two table tops.

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Instead of a metal belt 7, 27, it is conceivable to employ a smooth, tensionally rigid, yet pliable fabric belt.

It will of course be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.



CLAIMS:

1. A sheet fed printing press having a table on an upper surface of which sheets are transported between two side
5 lays to at least one front stop, wherein the distance between the side lays transverse to the transport direction of the sheets is adjustable to accommodate sheets of different widths, wherein the table surface has, at a longitudinal location corresponding with that of the side
10 lays, at least one elongate, transversely extending gap, part of which is occupied by one of said side lays to permit transverse positional adjustment of the side lay for different sheet widths, that or those parts of the gap on one or both sides of the side lay being covered by a portion
15 or portions of a flexible sheet support member, regardless of the transverse position of the side lay.
2. A press according to claim 1, in which the flexible sheet support member consists of a one-piece, uniformly
20 flexible surface, and wherein means are provided for guiding the flexible surface around the side lay.
3. A press according to claim 2, in which the uniformly
flexible surface is a flexible belt.
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4. A press according to claim 2 or 3, in which the uniformly flexible surface consists of a pliable metal belt.
5. A press according to claim 2 or 3, in which the
30 uniformly flexible surface consists of a smooth, tensionally rigid, yet pliable fabric belt.
6. A press according to claim 3, 4 or 5, in which the flexible belt is attached by one belt end to the feed table
35 in the region of the centre of the table, and by its other belt end to a side frame of the printing press and in which means for guiding the flexible belt are disposed on the side lay.



7. A press according to claim 3, 4 or 5, in which one end of the flexible belt is attached to the side lay at the side pointing from the side lay towards the centre of the table, and the other end is attached at the side of the side lay pointing away from the centre of the table, and the other end is attached at the side of the side lay pointing away from the centre of the table, and in which means for guiding the flexible belt are provided in a side frame of the printing press and in the region of the centre of the table.

8. A press according to any one of claims 3-7, in which the flexible belt is in the form of a means for displacement measurement for setting and/or determining the position of the side lay.

9. A press according to claim 7, in which the flexible belt is in the form of an actuating means for adjusting the side lay.

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10. A press according to any one or more of the preceding claims, in which the continuous surface is a closed surface.

11. A press substantially as hereinbefore described with reference to the accompanying drawings.

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