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Applicant: **YOSHIDA KOGYO K.K.**
No. 1 Kanda Izumi-cho Chiyoda-ku
Tokyo(JP)

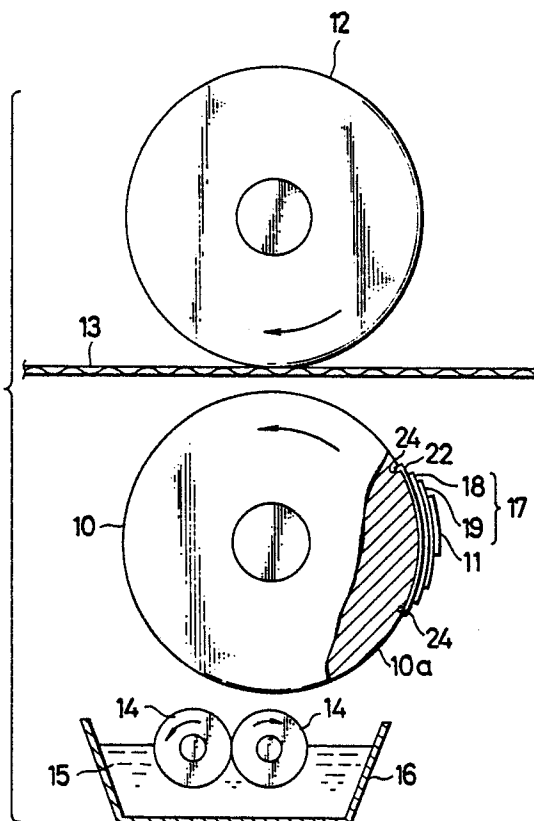
Inventor: **Nakagawa, Keizo**
4-37, Aza-Konnaizan Arigabukuro
Sanbongi-cho
Shida-gun Miyagi-ken(JP)

Representative: **Patentanwälte Leinweber &**
Zimmermann
Rosental 7/II Aufg.
D-8000 München 2(DE)

Device for attaching a printing plate to a form cylinder of a printing press.

A printing press includes a printing plate (11) detachably mounted on a plate cylinder (10) by a surface type fastener (17). The surface-type fastener (17) is composed of a looped fastener sheet (18) secured to a peripheral surface (10a) of the plate cylinder (10) and a hooked fastener sheet (19) secured to the back of the printing plate (11). With the use of the surface-type fastener (10), the replacement of the printing plate (11) can be carried out quickly and easily, thereby increasing the efficiency of the printing press.

FIG. 1



PRINTING PRESS

The present invention relates to printing presses for printing sheets of paper, cardboards or the like, and more particularly to a printing press having a printing plate detachably mounted on a plate cylinder.

A known printing press having a detachable printing plate includes a double-coated tape interposed between the printing plate and a plate cylinder for temporarily connecting them together.

With this arrangement, the double-coated tape must be replaced each time the printing plate is replaced with a different printing plate. Such replacing operation is tedious and time-consuming, thereby lowering the efficiency of the printing press. Another drawback is that the printing press adhered by virtue of the double-coated tape is likely to curl up during a continuing operation of the printing press. With this deformed printing plate, an accurate reproduction of a character, mark or design to be printed on a sheet of paper is difficult to obtain. Furthermore, since the known printing plate is relatively thick and heavy, a high speed printing is difficult to achieve when a plurality of such printing plates are mounted on a plate cylinder.

The present invention seeks to provide a printing press which is suitable for the batch printing of various products.

The present invention further seeks to provide a printing press incorporating structural features which enable rapid replacement of a printing plate, thereby increasing the efficiency of the printing press.

The present invention further seeks to provide a printing press in which a printing plate is firmly retained in position against curling-up during a continuous operation of the printing press.

The present invention further seeks to provide a printing press having a detachable printing plate which is relatively thin and lightweight and hence can be manufactured less costly.

According to the present invention, a printing press comprising: a plate cylinder supporting thereon a printing plate; an impression cylinder for pressing a sheet of paper against said printing plate; and a surface-type fastener including a cooperating pair of fastener sheets for detachably connecting said printing plate with said plate cylinder, one of said fastener sheets having a foundation fabric secured to a peripheral surface of said plate cylinder and a number of interlocking elements projecting from one surface of said foundation fabric, the other fastener sheet having a foundation fabric attached to a back of said printing plate and a number of interlocking elements projecting from one surface of said foundation fabric and releas-

ably engageable with said interlocking elements of said one fastener sheet.

With the surface-type fastener thus provided, the printing plate can be replaced with a different printing plate rapidly with utmost ease. The one fastener sheet may have a reinforcing lining bonded to the opposite surface of its foundation fabric so as to increase the rigidity of the fastener sheet. For easy positioning, the one fastener sheet may have positioning reference lines on one of opposite surfaces of its foundation fabric.

Many other advantages and features of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which preferred structural embodiments incorporating the principles of the present invention are shown by way of illustrative example.

Figure 1 is a diagrammatic front elevational view, with part cut-away for clarity, of a printing press according to the present invention;

Figure 2 is an enlarged perspective view of a portion of the printing press shown in Figure 1, illustrating the manner in which a printing plate is detachably mounted on a plate cylinder via a surface-type fastener;

Figure 3 is a fragmentary front elevational view of the plate cylinder including a modified fastener sheet constituting a part of the surface-type fastener;

Figure 4 is a perspective view showing the back of a modified form of fastener sheet; and

Figure 5 is a view similar to Figure 4, but showing the face of another modified fastener sheet.

As shown in Figure 1, a printing press embodying the present invention generally comprises a plate cylinder 10 rotatable about its own axis in the direction of the arrow and carrying thereon a printing plate 11, and an impression cylinder 12 rotatably disposed above the plate cylinder 10 in parallel spaced relation to the same and movable toward and away from the plate cylinder 10 for pressing a sheet 13 of paper or cardboard against the printing plate 11 to thereby print the sheet 13. The printing press further includes a pair of ink supply rollers 14 rotatably disposed below the plate cylinder 10 and held in contact with each other for feeding a controlled supply of ink 15 from an ink reservoir 16 to the printing plate 11.

The printing plate 11 is detachably connected to a peripheral wall 10a of the plate cylinder 10 by means of a surface-type fastener 17 generally known as a hook-and-loop fastener. The surface-type fastener 17 includes a cooperating pair of

fastener sheets 18, 19. As shown in Figure 2, the fastener sheet 18 has a rectangular flexible foundation fabric 20 and a number of interlocking elements in the shape of loops 21 projecting from one surface of the foundation fabric 20. The opposite surface of the foundation fabric 20 is attached by bonding to a support sheet 22 of synthetic resin film secured to the plate cylinder 10. The support sheet 22 extends over a portion of the entire peripheral surface 10a of the plate cylinder 10 and is firmly held in position against displacement. For such firm attachment to the plate cylinder 10, the support sheet 22 has a pair of opposite longitudinal ridges 23, 23 firmly fitted in mating axial guide grooves 24, 24 (Figure 1) in the peripheral surface 10a of the plate cylinder 10. The fastener sheet 19 is smaller than the looped fastener sheet 18 and has a rectangular flexible foundation fabric 25 and a number of interlocking elements in the shape of hooks 26 projecting from one surface of the foundation fabric 25. The opposite surface of the foundation fabric 25 is attached by bonding to the back of the printing plate 11.

The printing plate 11 is made of rubber or synthetic resin and has a relief surface including letters to be reproduced on the sheet 13 (Figure 1).

Before starting operation of the printing press, the printing plate 11 is attached to the plate cylinder 10 by simply sticking the hooked fastener sheet 19 onto the looped fastener sheet 18. Then, the impression cylinder 12 is adjusted in position relative to the plate cylinder 10 so as to provide, between itself and the printing plate 11, a nip slightly smaller than the thickness of a sheet 13 to be printed. When the printing press is energized, the plate cylinder 10, the impression cylinder 12 and the ink supply cylinders 14 are rotated respectively in the directions indicated by the arrows in Figure 1. Thus, the relief surface of the printing plate 11 becomes wet with ink. In synchronism with the rotation of the cylinders 10, 12, the sheets 13 of paper or cardboard stacked in a pile are supplied one by one between the plate cylinder 10 and the impression cylinder 12, whereupon the impression on the printing plate 11 is offset on each sheet 13. Because the surface-type fastener 17 has a cushioning property against force or pressure applied in a facewise direction, the printing plate 11 is deformable to conform with the configuration of a surface of the sheet 13, thereby accommodating the unevenness of the surface of the sheet 13 and the irregularity in thickness of the sheet 13. With this cushioning effect, a mark printed on the sheet 13 is clear and distinctive. The surface-type fastener 17 having a number of coupled interlocking elements 21, 26 is highly resistant to pulling force or tension applied in a facewise direction with the result that the printing plate 11 is held in position

against objectionable curling-up during a continuing operation of the printing press. With the use of the surface-type fastener 17, it is possible to reduce the thickness of the printing plate 11, thereby saving the material used for the formation of the printing plate 11. The printing plate 11 is therefore relatively thin and lightweight and can be manufactured at a low cost. The lightweight printing plate 11 is easy to handle and enables the plate cylinder to be rotated at high speeds, thereby increasing the efficiency of the printing press.

When the printing plate 11 is to be replaced with a different printing plate, the hooked fastener sheet 19 is peeled off from the looped fastener sheet 18 and then a hooked fastener sheet on the different printing plate is stuck to the looped fastener sheet 18. Such replacement of the printing plate 11 can be carried out easily and quickly.

A modified looped fastener sheet 27 shown in Figure 3 includes a reinforcing lining 28 of synthetic resin film bonded or fused with the back of the foundation fabric 20. The looped fastener sheet 27 thus reinforced is rigid and capable of supporting a relatively large and heavy printing plate. The reinforcing lining 28 is secured by bonding to the support sheet 22. In order to facilitate the positioning of the looped fastener sheet 27 relative to the support sheet 22, the reinforcing lining 28 may have a plurality of reference lines (not shown). Alternately, it is possible to provide such positioning reference lines 29 directly onto the back of a foundation fabric 30 of a looped fastener sheet 31, as shown in Figure 4. The positioning reference lines provide a checker pattern and they are formed by a suitable process, such as weaving, printing or dyeing.

Figure 5 shows a further modification in which a looped fastener sheet 32 has a plurality of positioning reference lines 33 appearing on the face of a foundation fabric 34. With the reference lines 33 thus provided, the printing plate 11 (Figure 2) can be accurately positioned on the plate cylinder 10 with utmost ease. Throughout the embodiments described above, the fastener sheet 18, 27, 31, or 32 may have hook-shaped interlocking elements, in which instance the fastener sheet 19 on the printing plate 11 has loop-shaped interlocking elements.

Claims

1. A printing press comprising: a plate cylinder (10) supporting thereon a printing plate (11); an impression cylinder (12) for pressing a sheet of paper (13) against said printing plate (11); and a surface-type fastener (17) including a cooperating pair of fastener sheets (18, 19) for detachably connecting said printing plate (11) with said plate cyl-

inder (10), one of said fastener sheets (18) having a foundation fabric (20) secured to a peripheral surface of said plate cylinder (10) and a number of interlocking elements (21) projecting from one surface of said foundation fabric (20), the other fastener sheet (19) having a foundation fabric (25) attached to a back of said printing plate (11) and a number of interlocking elements (26) projecting from one surface of said foundation fabric (25) and releasably engageable with said interlocking elements (21) of said one fastener sheet (18). 5 10

2. A printing press according to claim 1, said plate cylinder (10) including a support sheet (22) secured to said peripheral surface (10a), the opposite surface of said foundation fabric (20) of said one fastener sheet (18) being bonded on said support sheet (22). 15

3. A printing press according to claim 1, said one fastener sheet (27) including a reinforcing lining (28) secured to the opposite surface of said foundation fabric (20). 20

4. A printing press according to claim 3, said plate cylinder (10) including a support sheet (22) of synthetic resin film secured to said peripheral surface (10a), said reinforcing lining (28) being formed of a synthetic resin film and bonded with said support sheet (22). 25

5. A printing press according to claim 1, said foundation fabric (30) of said one fastener sheet (31) having a plurality of positioning reference lines (29) on its opposite surface. 30

6. A printing press according to claim 5, said positioning reference lines (29) forming a checker pattern.

7. A printing press according to claim 1, said foundation fabric (34) of said one fastener sheet (32) having a plurality of positioning reference lines (33) on its one surface. 35

8. A printing press according to claim 7, said positioning reference lines (33) forming a checker pattern. 40

9. A printing press according to claim 1, said interlocking elements (21) of said one fastener sheet (18, 27, 31, 32) being of the shape of loops, said interlocking elements (26) of said other fastener sheet (19) being of the shape of hooks. 45

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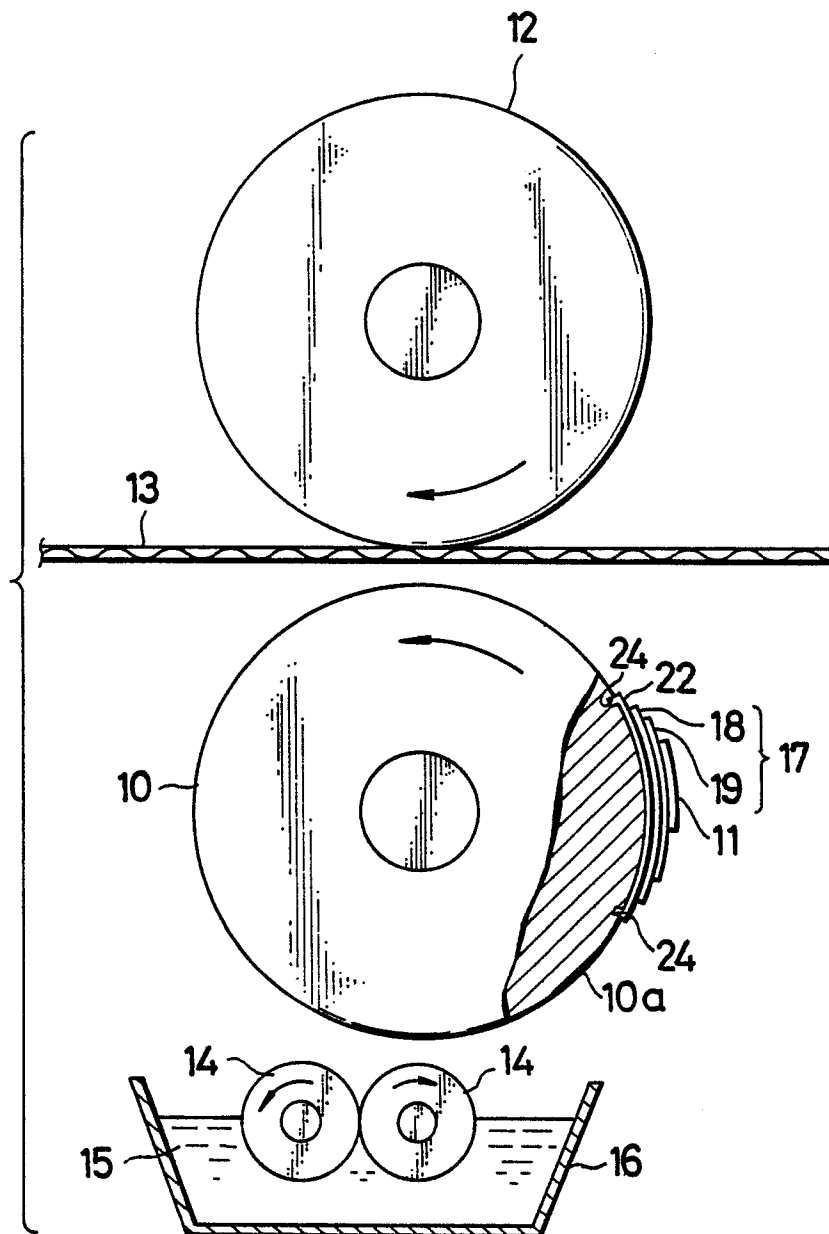
FIG. 1

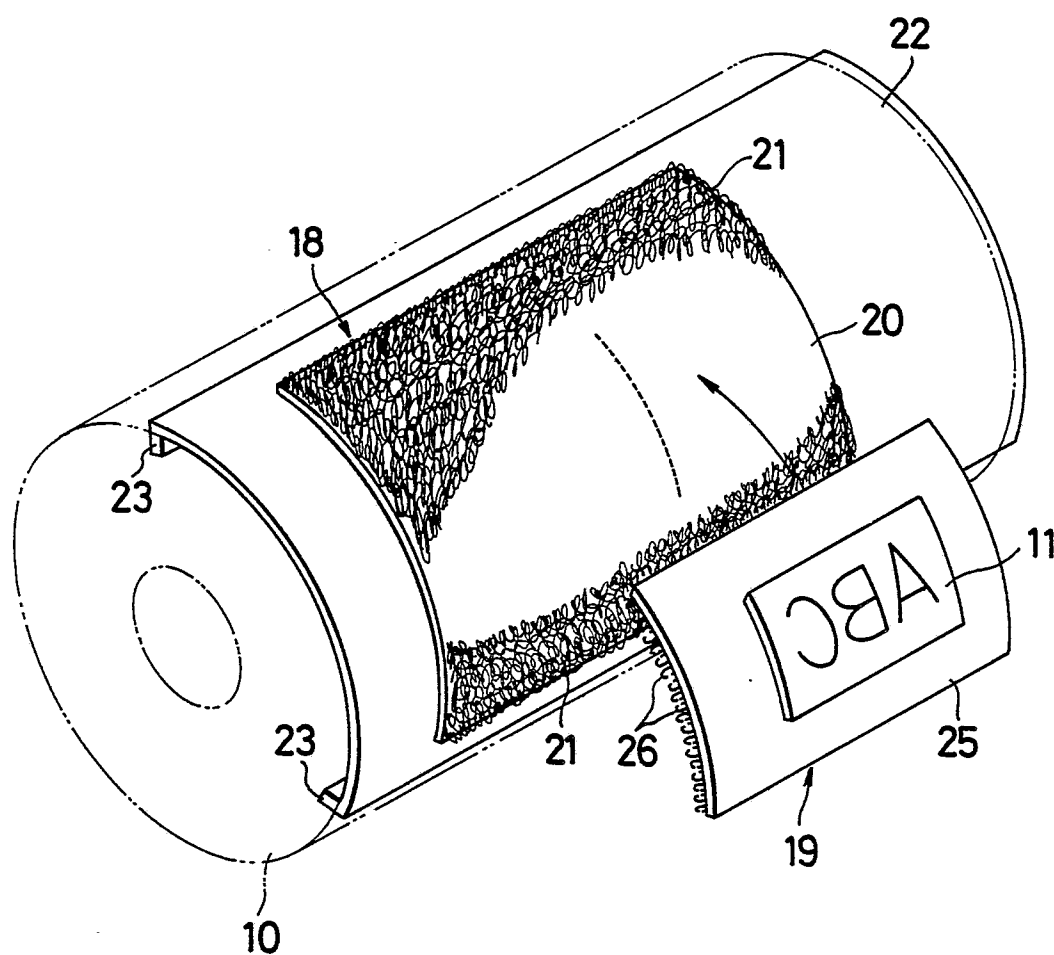
FIG. 2

FIG.3

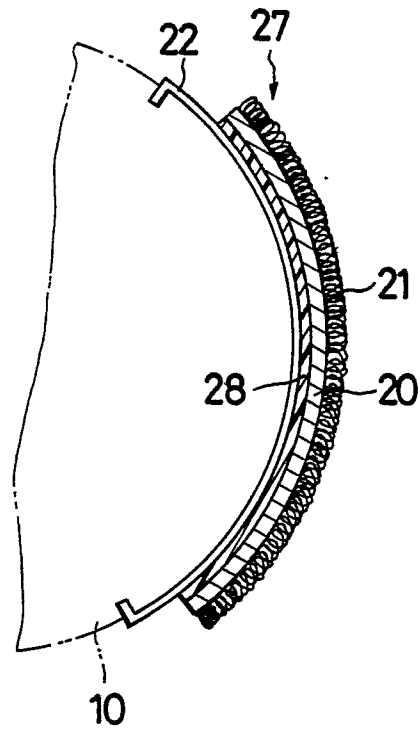


FIG.4

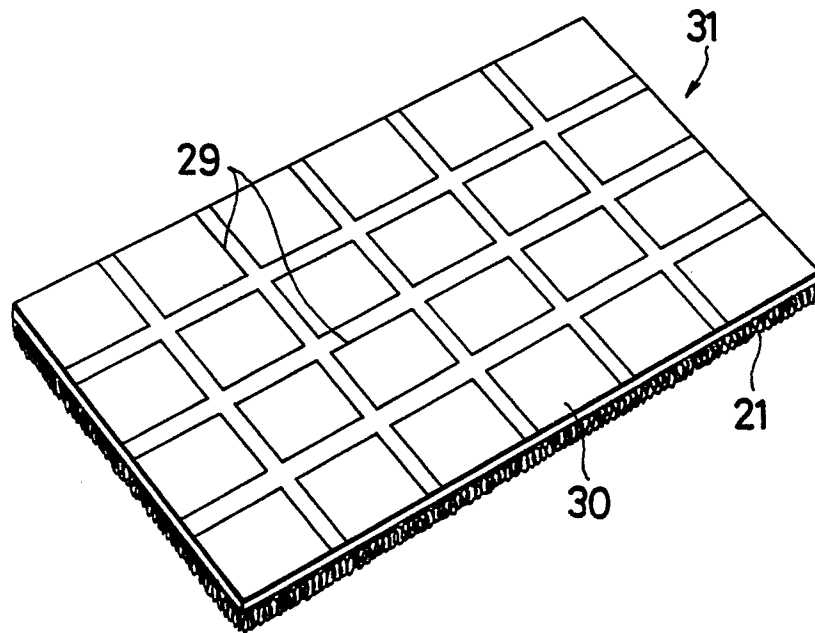


FIG.5

