



(19)

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(11)

EP 0 945 267 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
29.09.1999 Bulletin 1999/39

(51) Int. Cl.⁶: **B41F 17/00**

(21) Application number: **98302909.1**

(22) Date of filing: **15.04.1998**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **27.03.1998 CN 98102630**

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(54) An ink cup attachment mechanism

(57) A mechanism for releasably attaching an ink cup to a pad printing machine is disclosed, in which the pad printing machine includes a printing plate which is movable relative to the ink cup. The mechanism includes four pads, which are secured to the pad printing machine, and act on the ink cup in two opposite different directions during movement of the printing plate

relative to the ink cup. All four pads act on the ink cup below its centre of gravity, and in particular on an ink scraping ring on the bottom of the ink cup. Two of the pads are secured to a front panel of the mechanism, which may be detached from the mechanism to allow removal of the ink cup from the mechanism.

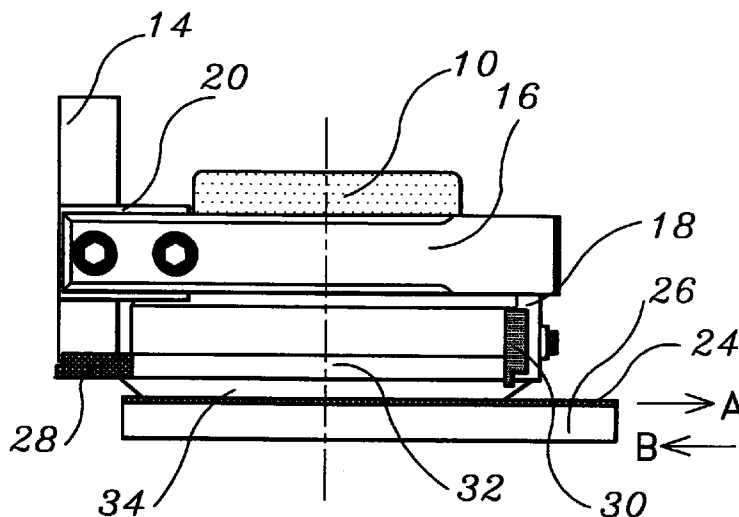


Fig. 3

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Description

[0001] This invention relates to a mechanism for attaching an ink cup to a pad printing machine (pad printer), and in particular, such a mechanism allowing easy retrieval and installation of the ink cup.

[0002] Pad printers are mainly used for printing on irregular surfaces. All ink cup is provided for containing the ink and the solvent, e.g. thinner, so that the ink is not exposed to the atmosphere. Such ink cups may be made of hardened steel, aluminium, nylon, ceramic or some other similar plastic materials. An image of the pattern to be printed is engraved on the upper surface of a steel plate. The ink cup is filled with ink and pressed against the steel plate with its opening end abutting the steel plate. During the relative movement of the ink cup across the upper surface of the steel plate, ink is left in the engraved image on the steel plate, to be picked up by a printing pad for subsequent printing on a work piece.

[0003] Ways have been devised to attach the ink cup to the pad printing machine, while allowing the ink cup to be released therefrom for maintenance or refilling of ink. One such mechanism is shown in GB 2 305 632 and includes a bracket which is pivotable relative to the pad printing machine. The bracket includes two arms, each with a recess for engaging one of two diametrically opposed protrusions of the ink cup, in order to attach the ink cup to the rest of the pad printing machine.

[0004] A disadvantage associated with this arrangement is that the ink cup can still "rock" during its movement relative to the printing plate, which may lead to leakage of the ink. In addition, the bottom edge of the ink cup will be worn out by reason of its movement on the surface of the steel plate. However, as the ink cup does not exhibit any rotational movement about its longitudinal axis, certain regions on the bottom edge of the ink cup may suffer from greater resistance, leading to uneven wearing out of the bottom edge of the ink cup.

[0005] It is therefore an object of the present invention to provide an ink cup attachment mechanism whereby the above shortcomings are mitigated, or at least to provide a useful alternative to the trade and public.

[0006] According to a first aspect of the present invention, there is provided a mechanism for releasably attaching an ink cup to a pad printing machine having a printing plate movable relative to said ink cup, characterized in that said mechanism comprises retaining means secured to said pad printing machine and adapted to act on the ink cup in two different directions during movement of the printing plate relative to the ink cup.

[0007] According to a second aspect of the present invention, there is provided a mechanism for releasably attaching an ink cup to a pad printing machine, characterized in that said mechanism comprises a panel member releasably engageable with said mechanism to attach said ink cup to said pad printing machine.

[0008] According to a third aspect of the present invention, there is provided a mechanism for releasably attaching an ink cup to a pad printing machine having a printing plate movable relative to said ink cup, said mechanism comprising retaining means secured to said pad printing machine and adapted to act on said ink cup during movement of the printing plate relative to said ink cup, characterized in that said retaining means is adapted to act on said ink cup below its centre of gravity.

[0009] An embodiment of the present invention will now be described with reference to the following drawings, in which:-

Fig. 1 is a bottom view of an ink cup attachment mechanism according to the present invention;

Fig. 2 is a front view of the attachment mechanism shown in Fig. 1, with a printing plate;

Fig. 3 is a side view of the attachment mechanism shown in Fig. 1, also with a printing plate; and

Fig. 4 is a top view of the attachment mechanism shown in Fig. 1.

[0010] As shown in Figs. 1 to 4, an ink cup 10 is shown as being attached to an ink cup attachment mechanism, generally designated as 12. The attachment mechanism 12 includes a back plate 14 which may be fixedly attached, e.g. by screws, to the rest of the pad printing machine (not shown). A pair of arms 16 are fixedly secured to two sides of the back plate 14. A front panel 18 is slidably engaged with the ends of the two arms 16. Also secured to the back plate 14 is a bracket 20 having a curved edge 22. The shape of the curved edge 22 follows substantially that of the upper cylindrical part of the ink cup 10.

[0011] In use, the ink cup 10 is placed on an upper surface of a printing plate 24, which is itself placed on a magnet plate 26. On the upper surface of the printing plate 24 is engraved an image of the pattern to be printed. During printing operation, the ink cup 10 may stay stationary relative to the rest of the pad printing machine, while the printing plate 24 and the magnet plate 26 reciprocate relative thereto in the directions shown by arrows A and B in Fig. 3. Alternatively, the printing plate 24 and the magnet plate 26 may stay stationary relative to the rest of the pad printing machine, while the ink cup 10 exhibits reciprocating movement, in the directions shown by the arrows A and B, relative to the printing plate 24 and the magnet plate 26. In the present example, however, it is envisaged that the ink cup 10 will stay stationary, while the printing plate 24 and the magnet plate 26 exhibit reciprocating movement.

[0012] It can be clearly seen that in the position as shown in Figs. 1 to 4, the ink cup 10 cannot be removed from the mechanism 12. The front panel 18 may, how-

ever, be detached from the pair of arms 16 to allow the ink cup 10 to be retrieved from or attached to the mechanism 12.

[0013] While a pair of fibre glass pads 28 are attached to the bottom of the back plate 14, a pair of fibre glass pads 30 are secured to the front panel 18. While Figs. 1 and 3 appear to show that all four pads 28, 30 are in contact with the ink cup 10, there is in fact a small clearance between the pads 28, 30 and the ink cup 10, such that there is room for relative movement between the ink cup 10 and the attachment mechanism 12. When the direction of movement of the printing plate 24 relative to the ink cup 10 is as shown by the arrow A in Fig. 3, the pads 30 will directly contact and abut against the ink cup 10 and exert a force thereagainst in the direction of the arrow B. On the other hand, when the direction of movement of the printing plate 24 relative to the ink cup 10 is as shown by the arrow B in Fig. 3, the pads 28 will directly contact and abut against the ink cup 10 and exert a force thereagainst in the direction of the arrow A, which is directly opposite to the direction of arrow B.

[0014] It can also be seen that the pads 28, 30 directly contact and act on an ink scraping ring (ring doctor blade) 34 at the bottom of the ink cup 10. The ink scraping ring 34 is made of ceramic or steel, and serves to clean the printing plate 24 of any unwanted ink, and to keep such ink within the ink cup 10. In particular, the pads 28, 30 act below the centre of gravity of the ink cup 10, whether such be empty or filled with ink and/or thinner. Such an arrangement will prevent rocking of the ink cup 10 during its movement relative to the printing plate 24.

[0015] It is found in practice that during the relative movement between the ink cup 10 and the printing plate 24, the ink cup 10 will also exhibit a rotational movement about its own longitudinal axis 32. Such a rotational movement is of a very slow rate, at roughly one round (i.e. 360°) per hour. However, such a rotational movement will significantly lengthen the working life of the ink scraping ring 34 before it needs to be sharpened again or replaced. It should be understood that neither the ink scraping ring 34 nor the printing plate 24 is perfectly planar. Thus, friction will occur during their relative movement, and the ink scraping ring 34 will therefore be worn out. However, if the ink cup 10 does not exhibit any rotational movement, certain parts of the ink scraping ring 34 will be worn out more quickly than certain other parts. However, because of the rotational movement of the ink cup 10 in the present arrangement, all parts of the ink scraping ring 34 will be worn out evenly, thus lengthening the working life of the ink scraping ring 34 before re-sharpening or replacement.

[0016] It should be understood that the above only illustrates an example whereby the present invention may be carried out, and that various modifications and/or alterations may be made thereto without departing from the spirit of the invention.

Claims

1. A mechanism for releasably attaching an ink cup to a pad printing machine having a printing plate movable relative to said ink cup, characterized in that said mechanism comprises retaining means secured to said pad printing machine and adapted to act on the ink cup in two different directions during movement of the printing plate relative to the ink cup.
2. A mechanism according to Claim 1 further characterized in that said retaining means comprises at least two retaining members, each of which being adapted to act on the ink cup in a different direction during movement of the printing plate relative to said ink cup.
3. A mechanism according to Claim 1 further characterized in that said retaining means comprises at least two pairs of retaining members, each pair of which being adapted to act on the ink cup in a different direction during movement of the printing plate relative to the ink cup.
4. A mechanism according to any of the preceding claims further characterized in that said two different directions are substantially opposite to each other.
5. A mechanism according to any of the preceding claims further characterized in that said two different directions are substantially parallel to the direction of relative movement between said ink cup and said printing plate.
6. A mechanism according to any one of Claims 2 to 5 further characterized in that said mechanism comprises a panel member to which at least one said retaining member is secured.
7. A mechanism according to any one of Claims 2 to 5 further characterized in that at least two said retaining members are secured to said panel member.
8. A mechanism for releasably attaching an ink cup to a pad printing machine, characterized in that said mechanism comprises a panel member releasably engageable with said mechanism to attach said ink cup to said pad printing machine.
9. A mechanism according to Claim 8 further characterized in that said panel member is releasably engageable with two arm members of said mechanism.
10. A mechanism according to Claim 9 further characterized in that said panel member is slidably movable.

ble relative to said arm members.

11. A mechanism for releasably attaching an ink cup to a pad printing machine having a printing plate movable relative to said ink cup, said mechanism comprising retaining means secured to said pad printing machine and adapted to act on said ink cup during movement of the printing plate relative to said ink cup, characterized in that said retaining means is adapted to act on said ink cup below its centre of gravity. 5 10
12. A mechanism according to Claim 11 further characterized in that said retaining means is adapted to act on an ink scraping member of said ink cup. 15
13. A mechanism according to Claim 11 further characterized in that said retaining means directly contacts said ink scraping member of said ink cup when said retaining means acts on said ink scraping member. 20
14. A mechanism according to Claim 12 or 13 further characterized in that said ink scraping member is in a ring shape. 25
15. A mechanism according to any one of Claims 11 to 14 further characterized in that said retaining means comprises at least two retaining members. 30
16. A mechanism according to any one of Claims 11 to 14 further characterized in that said retaining means comprises at least four retaining members.

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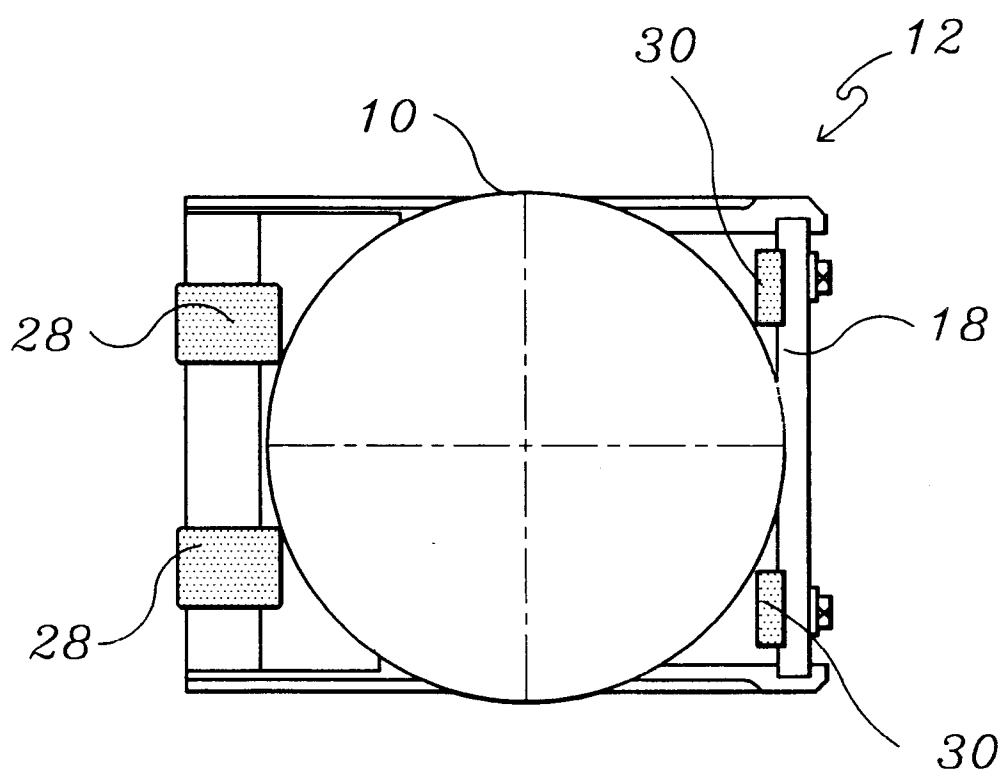


Fig. 1

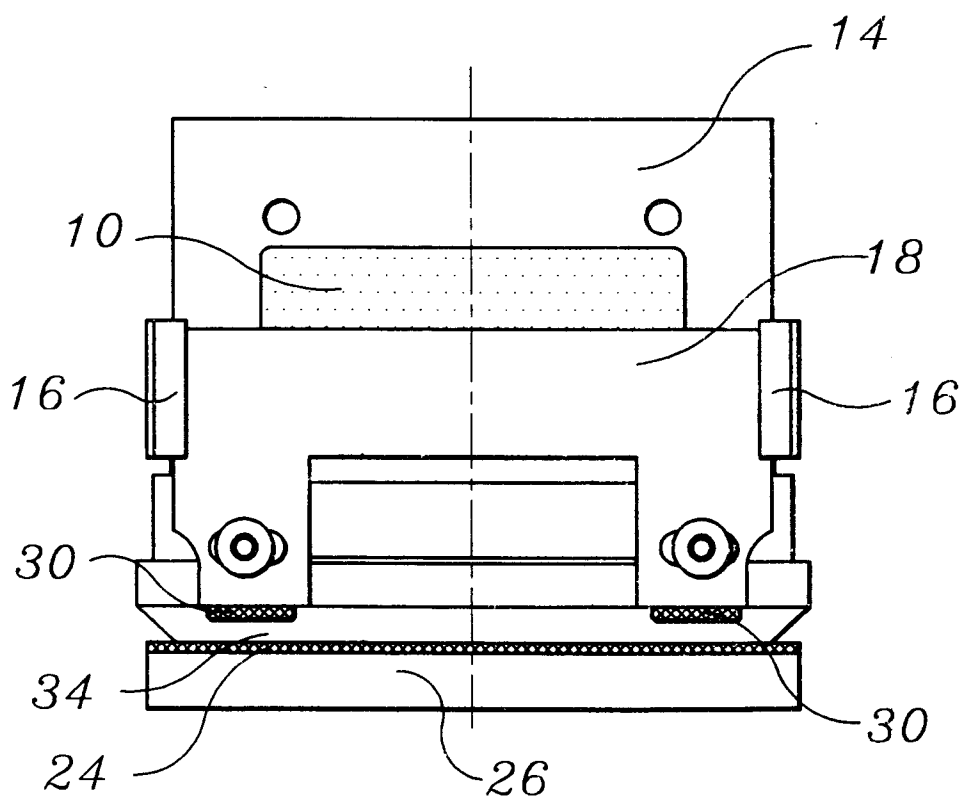


Fig. 2

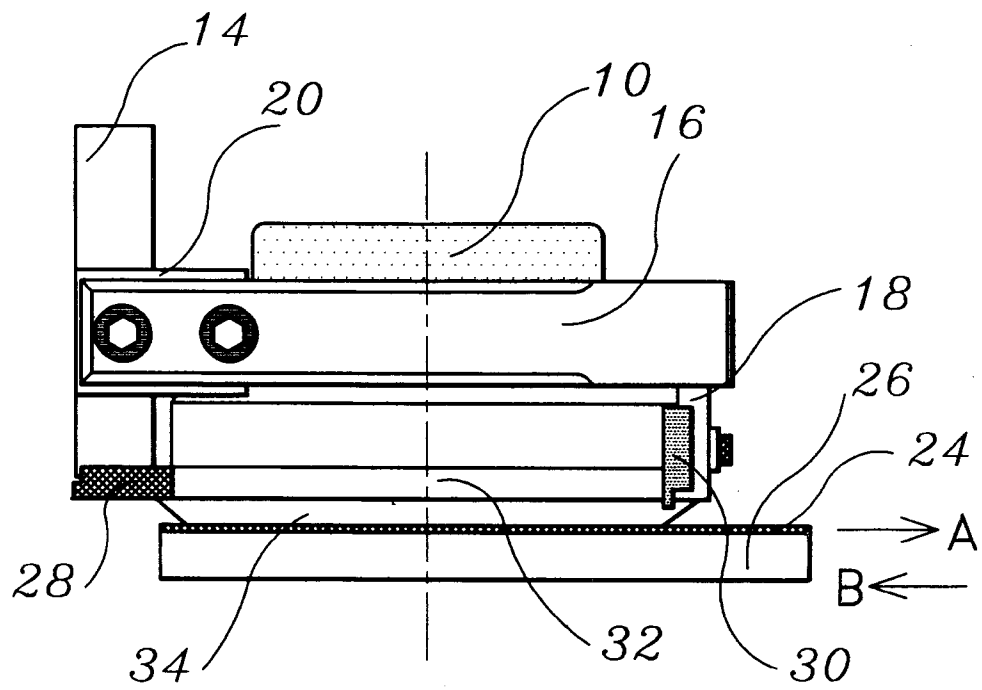


Fig. 3

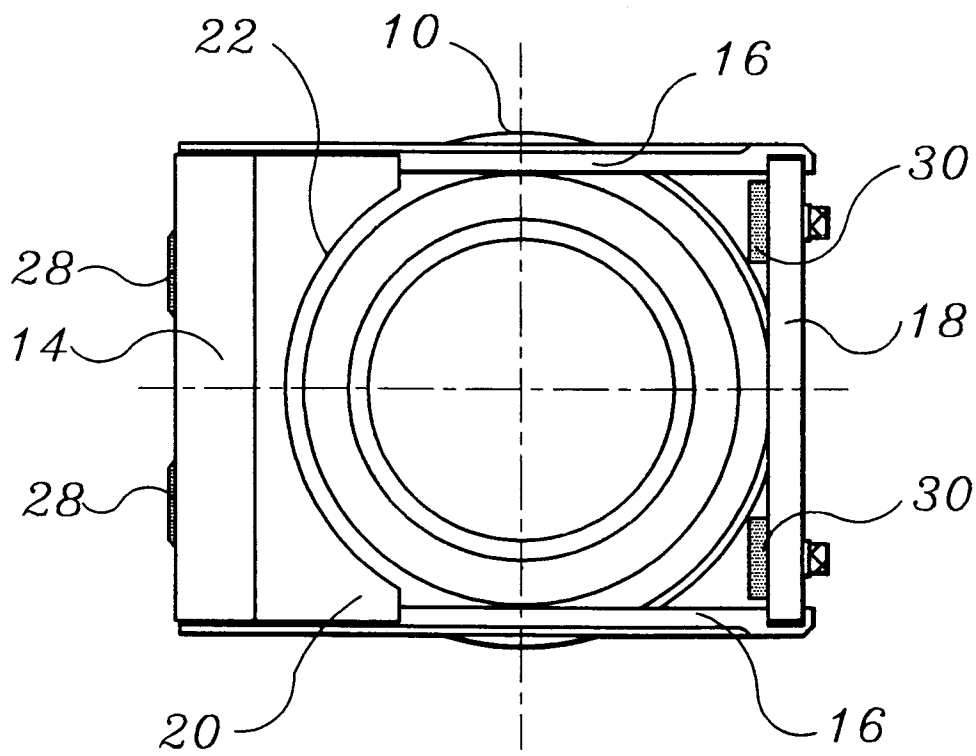


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 98 30 2909

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
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X,D	GB 2 305 632 A (HO DAVID WANG MAN) 16 April 1997 * page 7, line 21 - page 8, line 11; figure 8 * ---	1,4-15	
X	WO 97 37850 A (TECA PRINT AG ;BACHMANN LOUIS (CH)) 16 October 1997 * the whole document * ---	1-7	
X	EP 0 744 288 A (TRANS TECH AMERICA INC) 27 November 1996 * the whole document * ---	1,4,5, 11-16	
X	WO 93 11943 A (BACHMANN LOUIS) 24 June 1993 * abstract; figure 2 * -----	11,14	
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 25 June 1999	Examiner Zellhuber, W
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 98 30 2909

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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