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(54) Printing cylinder/roller cleaning apparatus for printing press.

(57) A printing cylinder/roller cleaning apparatus for a printing press includes a cleaning cloth (6), a take-up roll (14), a supply roll (8), a ratchet wheel (10), a lock lever (30), a swing lever (18), a one-way clutch (15), and an air cylinder (25). The cleaning cloth is pressed against a circumferential surface of a rotating printing cylinder/roller (2). The take-up shaft takes up the cleaning cloth. The supply roll supplies the cleaning cloth. The ratchet wheel is coaxially mounted on the supply roll. The lock lever engages with the ratchet wheel when the cleaning cloth is not taken up. The swing lever is coaxially mounted on the take-up roll and rotated to actuate the lock lever, thereby releasing engagement between the ratchet wheel and the lock lever. The one-way clutch connects the take-up roll with the swing lever only in a direction to take up the cleaning cloth. The air cylinder pivots the swing lever in response to the cleaning operation of the printing cylinder/roller.

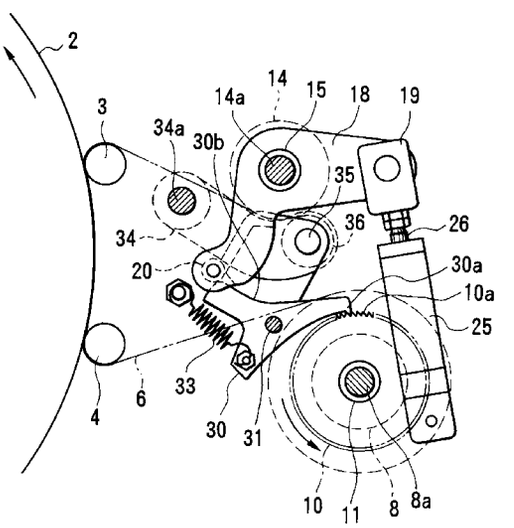

FIG.1A

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Background of the Invention

The present invention relates to a printing cylinder/roller cleaning apparatus for a printing press, which cleans the circumferential surface of a printing cylinder, e.g., a blanket cylinder, an impression cylinder, or a transfer cylinder, and the circumferential surface of a roller, e.g., a form roller or a vibrating roller.

Generally, a printing cylinder/roller cleaning apparatus of this type has a cleaning cloth take-up mechanism comprising a pair of rotatably supported roller-shaped cloth guides pressed against the circumferential surface of a printing cylinder/roller through a cleaning cloth, a supply shaft for supplying the cleaning cloth to the cloth guides, and a take-up shaft for taking up the cleaning cloth supplied from the supply shaft. The cleaning cloth is pressed against the circumferential surface of the printing cylinder/roller by intermittently taking up the cleaning cloth on the take-up shaft from the supply shaft, and the residue, e.g., ink dust or paper dust on the circumferential surface of the printing cylinder/roller is wiped with the cleaning cloth, thereby cleaning the circumferential surface of the printing cylinder/roller. In this case, when the cleaning cloth is taken up in the downstream side of the printing cylinder/roller, the cleaning cloth can be undesirably caught in the printing cylinder/roller. Thence, a countermeasure must be provided with regard to the supply shaft such that the cleaning cloth will not be pulled unless the cleaning cloth is taken up.

An example of an apparatus provided with such a countermeasure is a cylinder cleaning apparatus disclosed in Japanese Patent Laid-Open No. 2-20349. In the cylinder cleaning apparatus disclosed in this document, a rotation stop mechanism comprising a ratchet wheel mounted on the shaft end of a supply shaft, a ratchet to be engaged with this ratchet wheel, an air cylinder for engaging and disengaging the ratchet with and from the ratchet wheel, and a spring for biasing the ratchet away from the ratchet wheel are provided to the supply shaft. When the cleaning cloth is to be taken up on the take-up shaft, while the ratchet is separated from the ratchet wheel by the biasing force of the spring, the take-up shaft is driven by a take-up driving unit to take up the cleaning cloth. Unless the cleaning cloth is to be taken up, the ratchet is engaged with the ratchet wheel against the biasing force of the spring by the operation of the air cylinder as the driving unit of the rotation stop mechanism, so that rotation of the supply shaft in the supply direction is prohibited, thereby preventing the cleaning cloth to be pulled out.

However, in the conventional cylinder cleaning apparatus described above, the driving unit for driving the rotation stop mechanism comprising the air cylinder is required in addition to the take-up driving unit for the take-up shaft. In addition, since take-up driving of the take-up shaft and rotation regulation release of the supply shaft must be performed almost simultaneously, when the take-up driving mechanism and the rotation stop mechanism respectively having a separate driving means are to be interlocked, the entire apparatus is increased in size, and the operation becomes complicated, so that a smooth operation cannot be obtained.

Summary of the Invention

It is an object of the present invention to provide a printing cylinder/roller cleaning apparatus for a printing press, whose size can be decreased as a whole.

It is another object of the present invention to provide a printing cylinder/roller cleaning apparatus for a printing press, in which take-up operation and pull-out prevention of the cleaning cloth are smoothly associated with each other.

In order to achieve the above objects, according to the present invention, there is provided a printing cylinder/roller cleaning apparatus for a printing press, comprising a cleaning cloth pressed against a circumferential surface of a rotating printing cylinder/roller, a take-up shaft for taking up the cleaning cloth, a supply shaft for supplying the cleaning cloth, a ratchet wheel coaxially mounted on the supply shaft, a lock member engaged with the ratchet wheel when the cleaning cloth is not taken up, an actuating member, coaxially mounted on the take-up shaft and rotated, for actuating the lock member, thereby releasing engagement between the ratchet wheel and the lock member, a first one-way clutch for connecting the take-up shaft with the actuating member only in a direction to take up the cleaning cloth, and driving means for pivoting the actuating member in response to the cleaning operation of the printing cylinder/roller.

Brief Description of the Drawings

Fig . 1A is a side view showing a printing cylinder/roller cleaning apparatus for a printing press according to an embodiment of the present invention;

Fig. 1B is a view showing a state wherein a cleaning cloth is being taken up;

Fig. 2A is a view showing a state wherein the apparatus shown in Fig. 1A starts operation of taking up the cleaning cloth; and

Fig. 2B is a view showing a state wherein the operation of taking up the cleaning cloth is completed.

Description of the Preferred Embodiment

A preferred embodiment of the present invention will be described with reference to the accompanying drawings. Fig. 1A shows a printing cylinder/roller

cleaning apparatus for a printing press according to an embodiment of the present invention, Fig. 1B shows a state wherein a cleaning cloth is being taken up, Fig. 2A shows a state wherein an operation of taking up the cleaning cloth is started, and Fig. 2B shows a state wherein the operation of taking up the cleaning cloth is completed. Referring to Figs. 1A to 2B, reference numeral 2 denotes a blanket cylinder pressed against an impression cylinder (not shown). Roller-shaped cloth guides 3 and 4 rotatably supported between frames (not shown) are pressed against the circumferential surface of the blanket cylinder 2. A belt-like cleaning cloth 6 extends between the cloth guides 3 and 4 to be pressed against the circumferential surface of the blanket cylinder 2. The cleaning cloth 6 is supplied from a cloth supply shaft 8 and taken up by a take-up shaft 14 driven by a take-up mechanism (not shown).

Reference numeral 10 denotes a ratchet wheel having a circumferential surface formed with teeth 10a and coaxially mounted on a shaft 8a of the supply shaft 8. The ratchet wheel 10 is connected to the supply shaft 8 through a one-way clutch 11 so that when the ratchet wheel 10 is fixed, rotation of the supply shaft 8 in a direction to supply the cleaning cloth 6 is prohibited. An L-shaped swing lever 18 is swingably supported by a shaft 14a of the take-up shaft 14 as the swing shaft. The take-up shaft 14 is connected to the swing lever 18 through a one-way clutch 15 so that the take-up shaft 14 is rotatable only in a direction to take up the cleaning cloth 6.

An abutting block 19 is mounted on one end of the swing lever 18, and a roller 20 is provided on a rear surface of the other end of the swing lever 18. The abutting block 19 is coupled to the distal end of a rod 26 of an air cylinder 25 serving as an actuator. The swing lever 18 is swung about the shaft 14a by the rod 26 moving forward/backward from/into the air cylinder 25.

Reference numeral 30 denotes a substantially T-shaped lock lever supported to be swingable about a shaft 31. The lock lever 30 has one end provided with a ratchet 30a. The ratchet 30a is engaged with the teeth 10a of the ratchet wheel 10 to prohibit rotation of the ratchet wheel 10 in a direction to supply the cleaning cloth 6, i.e., counterclockwise in Fig. 1A. A cam surface 30b on which the roller 20 of the swing lever 18 slides is formed on the upper end face of the lock lever 30. The lock lever 30 is imparted with a swing habit by a compression spring 33 clockwise in Fig. 1A, i.e., in a direction such that its ratchet 30a engages with one of the teeth 10a of the ratchet wheel 10.

Reference numeral 34 denotes a V-shaped swing lever 34 swingable about its shaft 34a. A stopper pin 35 and a roller 36 for regulating the swing amount of the swing lever 18 are axially mounted on the swing end of the swing lever 34. The swing lever 34 is always imparted with a swing habit counterclockwise so that the roller 36 abuts against the circumferential surface of the take-up shaft 14. When the take-up diameter of the take-up shaft 14 increases, the swing lever 34 is gradually moved against the swing habit, and accordingly the stopper pin 35 is also moved clockwise. Then, the counterclockwise swing amount of the swing lever 18 abutting against the stopper pin 35 is regulated to be small, so that the take-up amount of the cleaning cloth 6 defined by the swing amount is adjusted almost at a constant value. That is, a predetermined length of the cleaning cloth 6 can be constantly taken up by one take-up operation regardless of the take-up diameter of the take-up shaft 14.

The operation of this printing cylinder/roller will be described. During cleaning of the blanket cylinder 2, the air cylinder 25 is actuated to move the rod 26 forward, so that a soiled portion of the cleaning cloth 6 is taken up and a clean portion of the cleaning cloth 6 is supplied through the cloth guides 3 and 4. When the rod 26 is moved forward, the swing lever 18 swings counterclockwise about the shaft 14a. At this time, since the swing lever 18 is coupled to the take-up shaft 14 through the one-way clutch 15 so that the take-up shaft 14 is rotatable only counterclockwise, the cleaning cloth 6 will not adhesively attach to an ink tack or the like and be pulled out from the take-up shaft 14 to the blanket cylinder 2.

When the swing lever 18 swings counterclockwise, the roller 20 slides on the cam surface 30b of the lock lever 30 from the state shown in Fig. 1A, and swings the lock lever 30 counterclockwise against the biasing force of the compression spring 33. Hence, as shown in Fig. 2A, the ratchet 30a is separated from the corresponding one of the teeth 10a of the ratchet wheel 10 to release engagement between the ratchet 30a and the corresponding one of the teeth 10a, and the ratchet wheel 10 is released and may rotate .

The supply shaft 8 is connected to the ratchet wheel 10 through the one-way clutch 11 so that the supply shaft 8 will not rotate counterclockwise. When the ratchet 30a and the corresponding one of the teeth 10a are engaged with each other, the cleaning cloth 6 will not be pulled out. As described above, when engagement between the ratchet 30a and the corresponding one of the teeth 10a is released, the supply shaft 8 is rotated counterclockwise, together with the ratchet wheel 10, about the shaft 8a. Thus, a clean portion of the cleaning cloth 6 is pulled out, supplied, and taken up by the take-up shaft 14.

As the rod 26 is moved forward, when the swing lever 18 abuts against the stopper pin 35, as shown in Fig. 2B, rotation of the supply shaft 8 connected to the swing lever 18 is stopped, and the take-up operation of the cleaning cloth 6 is completed. Thereafter, when the rod 26 starts to be moved backward, the swing lever 18 swings clockwise, and accordingly the

lock lever 30 is also caused to start swinging clockwise by the restoring force of the compression spring 33. When the roller 20 is disengaged from the cam surface 30b, the ratchet 30a of the lock lever 30 engages with the corresponding one of the teeth 10a of the ratchet wheel 10, and the supply shaft 8 is also locked by the one-way clutch 11 which is connected to the ratchet wheel 10 such that its counterclockwise rotation is disabled. Hence, the cleaning cloth 6 will not be pulled out from the supply shaft 8 unless it is taken up. This operation is repeated by intermittently moving the rod 26 forward/backward, so that the cleaning cloth 6 is intermittently taken up.

In this embodiment, the printing cylinder/roller to be cleaned with the cleaning cloth 6 is the blanket cylinder 2. However, the present invention is not limited to this, and can naturally be applied to any other printing cylinder or a rotating roller. The cleaning cloth 6 is pressed against the circumferential surface of the blanket cylinder 2 by the pair of roll-shaped cloth guides 3 and 4. However, the present invention is not limited to this, and various design modifications can be made. The swing lever 18 and the lock lever 30 are interlocked with each other through the roller 20 and the cam surface 30b. However, the present invention is not limited to this, and the swing lever 18 and the lock lever 30 may be coupled through a link mechanism. Alternatively, in place of the swing lever 18, for example, a pinion may be axially mounted on the take-up shaft 14, the rod 26 may be provided with a rack to be meshed with the pinion, and the lock lever 30 may be directly coupled to the rod 26. In this case, the pinion and the lock lever 30 need not be swingable, and the compression spring 33 for biasing the lock lever 30 can be eliminated. In place of the air cylinder 25, an actuator may be adopted as the actuator, as a matter of course. The ratchet wheel 10 is coupled to the supply shaft 8 through the one-way clutch 11. However, it is apparent that a similar effect to this can be obtained even by integrally coupling the ratchet wheel 10 with the supply shaft 8.

As has been described above, according to the present invention, since the air cylinder serving as the driving means of the take-up shaft is used also as the driving means for releasing rotation regulation of the supply shaft, thus eliminating an exclusive driving means, the apparatus can be reduced in size. Furthermore, since the supply and take-up operations of the cleaning cloth can be performed in an interlocked manner by the operation of a single driving means, a smooth take-up operation and pull-out prevention of the cleaning cloth can be obtained.

Claims

1. A printing cylinder/roller cleaning apparatus for a printing press, characterized by comprising:

   a cleaning cloth (6) pressed against a circumferential surface of a rotating printing cylinder/roller (2);

   a take-up shaft (14) for taking up said cleaning cloth;

   a supply shaft (8) for supplying said cleaning cloth;

   a ratchet wheel (10) coaxially mounted on said supply shaft;

   a lock member (30) engaged with said ratchet wheel when said cleaning cloth is not taken up;

   an actuating member (18), coaxially mounted on said take-up shaft and rotated, for actuating said lock member, thereby releasing engagement between said ratchet wheel and said lock member;

   a first one-way clutch (15) for connecting said take-up shaft with said actuating member only in a direction to take up said cleaning cloth; and

   driving means (25) for pivoting said actuating member in response to a cleaning operation of the printing cylinder/roller.

2. An apparatus according to claim 1, wherein said actuating member comprises a swing lever (18) having a swing end, and said swing end is caused to act on said lock member by a swing movement of said swing lever, thus releasing engagement between said lock member and said ratchet wheel.

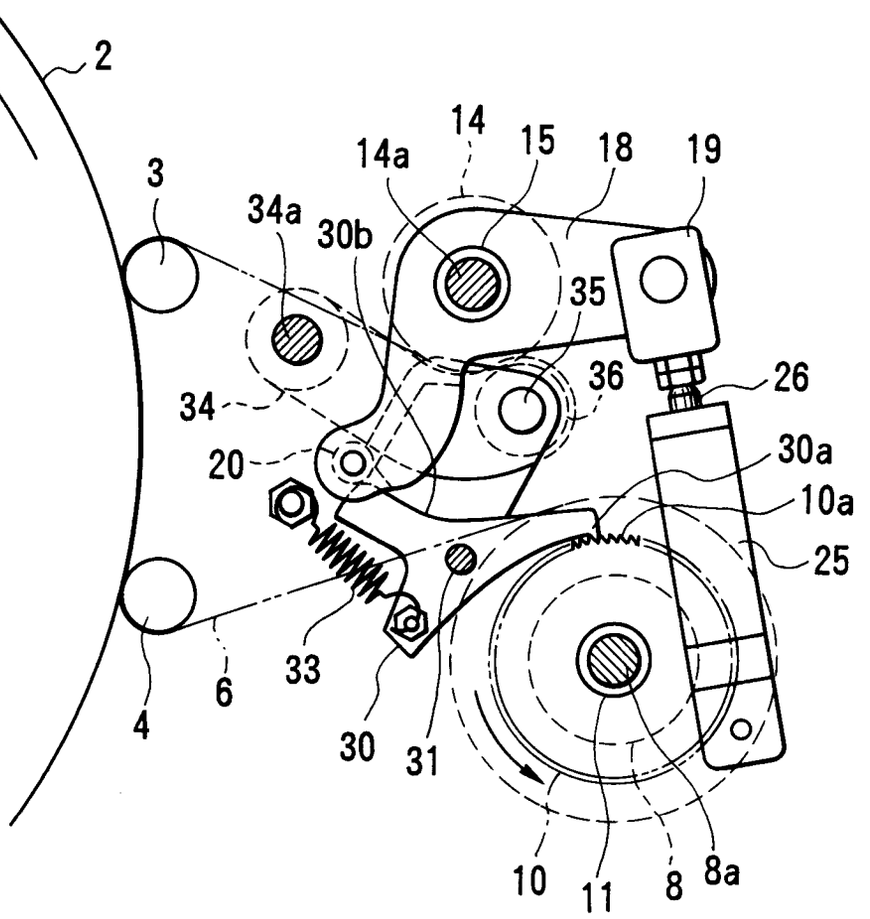
3. An apparatus according to claim 2, further comprising a stop member (35) for adjusting the swing amount of said swing lever in accordance with the take-up diameter of said take-up shaft, and wherein said take-up shaft takes up a substantially constant amount of cleaning cloth in accordance with the swing amount of said swing lever regardless of the take-up diameter.

4. An apparatus according to claim 1, wherein said lock member comprises a lever having a ratchet (30a) engaging with said ratchet wheel and a cam surface (30b) on which said actuating member slides, and said actuating member slides on said cam surface to swing said lock member, thereby releasing engagement between said ratchet and said ratchet wheel.

5. An apparatus according to claim 1, wherein said driving means comprises an air cylinder (25) having a rod (26) coupled to said actuating member, and said actuating member is rotated forward and backward by a reciprocal movement of said rod.

6. An apparatus according to claim 1, further com-

prising a second one-way clutch (11) for connecting said supply shaft with said ratchet wheel only in a direction to supply said cleaning cloth.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34a
30b
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8a

FIG.1A

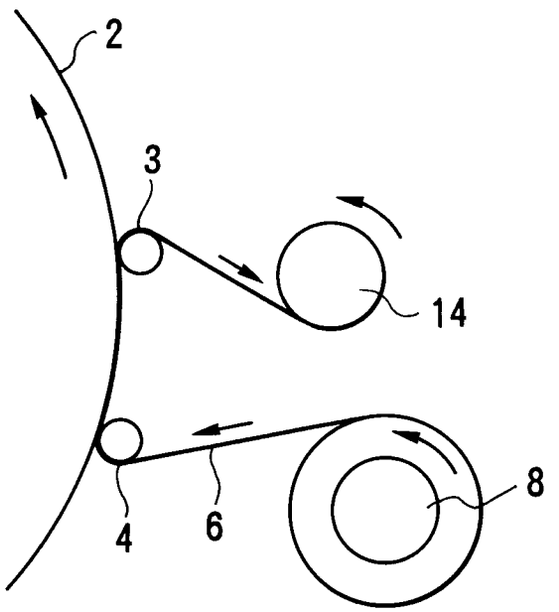
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FIG.1B

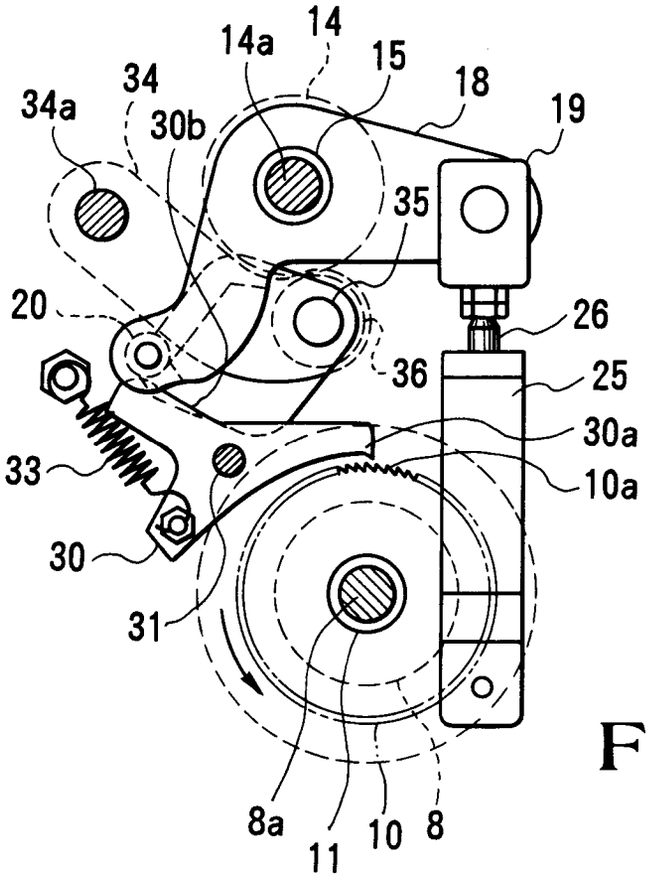
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FIG.2A

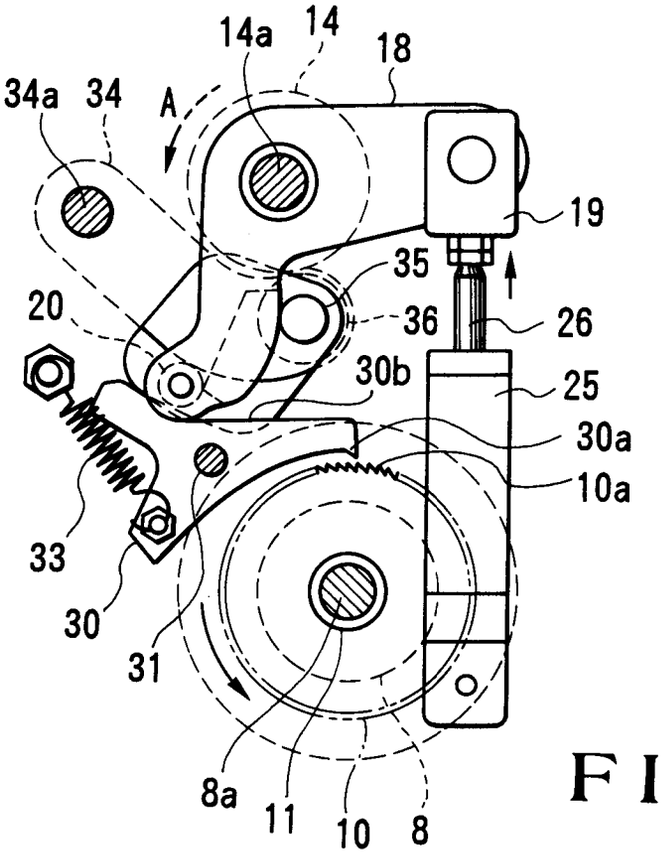
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FIG.2B

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 93 25 0032

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	EP-A-0 372 253 (BALDWIN-GEGENHEIMER GMBH) * figure 2 * * column 3, line 58 - column 5, line 5 *	1,2,5	B41F35/00
Y	DE-A-2 538 105 (H.J. MOESTUE) * figures 2-4 * * page 9, line 24 - page 10, line 10 * * page 11, line 12 - line 26 *	1,2,5	
A		4	
A,D	PATENT ABSTRACTS OF JAPAN vol. 14, no. 157 (M-955)27 March 1990 & JP-A-20 20 349 (NIPPON BALDWIN KK) 23 January 1990 * abstract *	1,4,5	
A	DE-U-8 307 296 (GEORG SPIESS GMBH) * figure 3 * * page 11, line 21 - line 29 *	1-3,5	
A	DE-A-4 027 505 (Y. MURAKAMI ET AL.) * figure 4 * * column 7, line 3 - column 8, line 5 *	1,3	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	EP-A-0 334 173 (M.A.N.-ROLAND DRUCKMASCHINEN AKTIENGESELLSCHAFT) * figure 1 * * page 3, line 23 - line 31 *	1,3,5	B41F
A	EP-A-0 445 600 (KOMORI CORPORATION)		
A	GB-A-169 826 (R. SOLOMON ET AL.)		
A	PATENT ABSTRACTS OF JAPAN vol. 15, no. 443 (M-1178)12 November 1991 & JP-A-31 89 156 (NIPPON BALDWIN KK) 19 August 1991 * abstract *		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	03 MAY 1993	HAEUSLER F.U.

CATEGORY OF CITED DOCUMENTS

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