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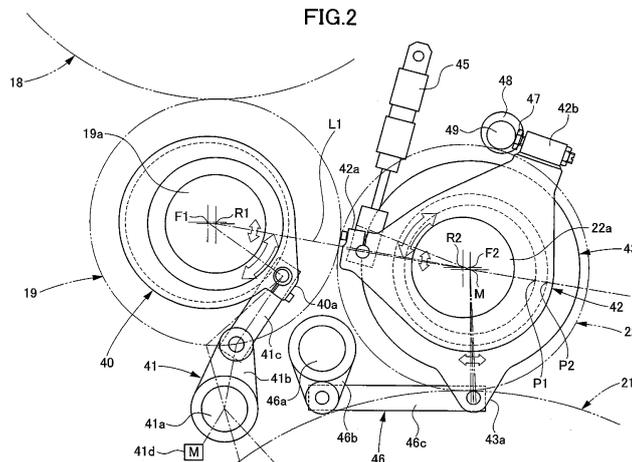
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(54) **CYLINDER DEVICE FOR PRINTING PRESS**

(57) Provided is a cylinder device for a printing press, which is simple in configuration, and with which the printing pressure in at least three cylinders can be adjusted in a highly accurate manner. The device is provided with: a collecting plate cylinder (22) supported so as to be capable of moving towards or away from a collecting blanket cylinder (21) and a blanket cylinder (19); an eccentric inner metal (42) that rotatably supports the collecting plate cylinder (22), and that by rotating moves the collecting plate cylinder (22) towards or away from the collecting blanket cylinder (21); a hydraulic cylinder (45) that

rotates the eccentric inner metal (42); an eccentric outer metal (43) that axially supports the eccentric inner metal (42), and that by rotating moves the collecting plate cylinder (22) towards or away from the blanket cylinder (19); a drive device (46) for rotating the eccentric outer metal (43); a stopper (49) provided to a main machine frame (44); and an adjustment bolt (47) provided to the eccentric inner metal (42), for abutting the stopper (49) when the collecting plate cylinder (22) moves towards the collecting blanket cylinder (21).



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Description

TECHNICAL FIELD

[0001] The present invention relates to a cylinder device for a printing press

BACKGROUND ART

[0002] In printing of securities and the like, various printing methods including intaglio printing, relief printing, and lithographic printing are combined in a complex way for the purpose of anti-counterfeiting and the like. The intaglio printing by which fine and clear images can be obtained is used in printing of portraits and face values, the relief printing by which readable sharp letters can be printed is used in printing of serial numbers, and the lithographic (offset) printing suitable for multi-color printing is used in printing of patterns. Furthermore, collect printing which is a special printing method is employed for printing of some of the patterns.

[0003] In the collect printing, for example, inks of different colors are applied respectively to multiple partial plate cylinders. Then, the inks applied to the respective partial plate cylinders are collected by a collecting blanket cylinder and a collecting plate cylinder, and transferred onto paper passing through between a blanket cylinder and an impression cylinder. The collect printing thus not only has a characteristic that the color of an image line can be changed in the middle of the line but also has a characteristic that no misalignment occurs at all in a portion where the color changes. Accordingly, an effect of anti-counterfeiting is great.

PRIOR ART DOCUMENT

PATENT DOCUMENT

[0004]

Patent Document 1: Japanese Examined Utility Model Registration Application Publication No. Hei 7-291

Patent Document 2: Japanese Patent No. 4611493

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0005] In a collect printing press, a printing pressure between the collecting blanket cylinder and the collecting plate cylinder is adjusted, and then a printing pressure between the collecting plate cylinder and the blanket cylinder is adjusted. In other words, printing pressure needs to be adjusted between every two of the three cylinders. Accordingly, a printing pressure adjustment mechanism including eccentric bearings, devices for driving the eccentric bearings, and the like is complex, and there may

be a case where the printing pressures cannot be adjusted with high accuracy.

[0006] Patent Document 2 discloses a printing pressure adjustment mechanism which performs printing pressure adjustment and position adjustment between two cylinders. In this printing pressure adjustment mechanism, double eccentric bearings are used to perform the printing pressure adjustment and the position adjustment between the two cylinders to suppress looseness (gap) between eccentric bearings.

[0007] An object of the present invention is to provide a cylinder device for a printing press to which the technique of the printing pressure adjustment mechanism using the double eccentric bearings is applied and which can adjust printing pressures among at least three cylinders with high accuracy in a simple configuration.

MEANS FOR SOLVING THE PROBLEMS

[0008] A cylinder device for a printing press according to a first aspect of the present invention for solving the problems described above comprises:

a second cylinder supported on a pair of supporting members to be capable of being moved toward and away from a first cylinder and a third cylinder;
 a pair of first eccentric bearings by which both end portions of the second cylinder are rotatably supported and which move the second cylinder toward and away from the first cylinder by being turned;
 first driving means for turning the pair of first eccentric bearings;
 a pair of second eccentric bearings by which the pair of first eccentric bearings are pivotally supported and which moves the second cylinder toward and away from the third cylinder by being turned, the pair of second eccentric bearings pivotally supported by the pair of supporting members;
 second driving means for turning the pair of second eccentric bearings;
 contact members which are provided in the pair of supporting members; and
 contact portions which are provided in the pair of first eccentric bearings and which are brought into contact with the contact members when the second cylinder is brought into contact with the first cylinder by drive of the first driving means.

[0009] A cylinder device for a printing press according to a second aspect of the present invention for solving the problems described above is characterized in that the contact members are such that turning amounts of the first eccentric bearings when the contact members are in contact with the contact portions are capable of being adjusted.

[0010] A cylinder device for a printing press according to a third aspect of the present invention for solving the problems described above is characterized in that

a rotation center of the first eccentric bearings and a rotation center of the second eccentric bearings are disposed on an opposite side of a rotation center of the second cylinder, to a contact point between the second cylinder and the third cylinder, and

the rotation center of the second eccentric bearings is arranged on an opposite side of the rotation center of the first bearings, to a contact point between the first cylinder and the second cylinder.

[0011] A cylinder device for a printing press according to a fourth aspect of the present invention for solving the problems described above is characterized in that, in a state where the contact members and the contact portions are in contact with each another,

force about the contact members is constantly applied to the first eccentric bearings by the first driving means in a direction in which the second cylinder is moved away from the third cylinder, and

the first eccentric bearings and the second eccentric bearings press the second eccentric bearings and the supporting members, respectively, in a direction of a substantial extension of a straight line connecting a rotation center of the third cylinder and a rotation center of the second cylinder.

[0012] A cylinder device for a printing press according to a fifth aspect of the present invention for solving the problems described above is characterized in that the third cylinder is supported by the supporting members via a fourth eccentric bearing which is turned by fourth driving means.

[0013] A cylinder device for a printing press according to a sixth aspect of the present invention for solving the problems described above is characterized in that the cylinder device further comprises a fourth cylinder supported to be capable of being moved toward and away from the third cylinder, wherein

turning by the fourth driving means enables adjustment of a printing pressure between the third cylinder and the fourth cylinder, in addition to throwing the third cylinder on and off the second cylinder and throwing the third cylinder on and off the fourth cylinder.

EFFECT OF THE INVENTION

[0014] Accordingly, in the cylinder device for a printing press in the present invention, the printing pressure between the second cylinder and the third cylinder can be adjusted by turning the second eccentric bearings, with the printing pressure between the first cylinder and the second cylinder maintained, the printing pressure between the first cylinder and the second cylinder adjusted by turning the first eccentric bearings and by bringing the contact portions in the first eccentric bearings and the contact members in the supporting members into contact with one another. Accordingly, the printing pressures can be adjusted with high accuracy in a simple configuration.

[0015] Moreover, looseness (gaps) among the first eccentric bearings, the second eccentric bearings, and the

supporting members can be eliminated by bringing the contact members provided in the supporting members and the contact portions in the first eccentric bearings into contact with one another and thereby causing the first eccentric bearings and the second eccentric bearings to press the second eccentric bearings and the supporting members, respectively, in the same direction. Accordingly, the printing can be performed with high accuracy.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

[Fig. 1] Fig. 1 is an overall configuration diagram of a collect printing press employing a cylinder device for a printing press of the present invention.

[Fig. 2] Fig. 2 is an enlarged view of the cylinder device in a collect printing unit.

[Fig. 3] Fig. 3 is a cross-sectional view of an eccentric bearing structure for a collecting plate cylinder.

[Fig. 4] Fig. 4 is a view illustrating operations of the collecting plate cylinder.

MODE FOR CARRYING OUT THE INVENTION

[0017] A cylinder device for a printing press in the present invention is described below in detail by using the drawings.

EMBODIMENT

[0018] A collect printing press illustrated in Fig. 1 is a printing press in which a collect printing unit and a double-sided offset printing unit are combined.

[0019] Specifically, as illustrated in Fig. 1, in the collect printing press, a supplying unit 10, a collect printing unit 11, a double-sided offset printing unit 12, and a discharging unit (omitted in the drawings) are arranged in this order from an upstream side to a downstream side in a paper conveying direction. Paper sheets supplied from the supplying unit 10 are thus transferred one by one to an impression cylinder 18 of the collect printing unit 11 via a swing 13 and four transfer cylinders 14, 15, 16, 17, and are then supplied through between the impression cylinder 18 and a blanket cylinder 19.

[0020] In the collect printing unit 11, three partial plate cylinders 20, a collecting blanket cylinder 21, a collecting plate cylinder 22, the blanket cylinder 19, and the impression cylinder 18 are arranged in this order from the lower side to the upper side. In this case, the cylinder arrangement in the collect printing unit 11 is as follows: an angle between a straight line connecting the rotation center of the impression cylinder 18 and the rotation center (referred to as R1 below) of the blanket cylinder 19 and a straight line (referred to as L1 below) connecting the rotation center of the blanket cylinder 19 and the rotation center (referred to as R2 below) of the collecting plate

cylinder 22 is substantially 90°; and an angle formed between the straight line connecting the rotation center of the blanket cylinder 19 and the rotation center of the collecting plate cylinder 22 and a straight line connecting the rotation center of a collecting blanket cylinder 21 and the rotation center of the collecting plate cylinder 22 is substantially 90°.

[0021] Image lines on the partial plate cylinders 20 are integrally transferred onto the collecting plate cylinder 22 via the collecting blanket cylinder 21, then further transferred onto the blanket cylinder 19, and printed on a paper sheet supplied through between the blanket cylinder 19 and the impression cylinder 18. Note that reference numeral 23 depicted in Fig. 1 denotes ink supplying devices which supply inks of different colors to the three partial plate cylinders 20, respectively.

[0022] The paper sheet subjected to collect printing is transferred from the impression cylinder 18 to an impression cylinder 24 of a front-side offset printing unit 12a for a first color (first stage) in the double-sided offset printing unit 12, and is subjected to offset printing on a front side. Then, the paper sheet subjected to the offset printing on the front side is transferred from the impression cylinder 24 to an impression cylinder 29 of a back-side offset printing unit 12b for the first color (first stage) to be subjected to offset printing on a back side.

[0023] The front-side offset printing unit 12a includes: a double-duct ink supplying device 26 having two ink fountains 25a, 25b; a plate cylinder 27; a blanket cylinder 28; and the impression cylinder 24. Moreover, the collect printing press is provided with multiple stages of front-side offset printing units 12a. In each of the front-side offset printing units 12a, image lines of a predetermined color transferred from the plate cylinder 27 are printed on the front side of the paper sheet supplied through between the impression cylinder 24 and the blanket cylinder 28.

[0024] Meanwhile, the back-side offset printing unit 12b includes: a double-duct ink supplying device 31 having two ink fountains 30a, 30b; a plate cylinder 32; a blanket cylinder 33; and the impression cylinder 29. Moreover, the collect printing press is provided with multiple stages of back-side offset printing units 12b. In each of the back-side offset printing units 12b, image lines of a predetermined color transferred from the plate cylinder 32 are printed on the back side of the paper sheet supplied through between the impression cylinder 29 and the blanket cylinder 33.

[0025] The collect printing press is thus configured to perform the front-side printing and the back-side printing alternatively on the paper sheet with the impression cylinders 24, 29 of the adjacent offset printing units 12a, 12b, ... brought into contact with each other without a transfer cylinder provided therebetween. Note that the paper sheet subjected to the last offset printing is discharged from the impression cylinder 29 of the back-side offset printing unit 12b of the last color and then stacked on a pile of the discharging unit.

[0026] Moreover, as illustrated in Fig. 2, both of left and right end shafts 19a of the blanket cylinder (third cylinder) 19 are rotatably supported by a pair of left and right main unit frames (supporting members) 44 via eccentric metals (fourth eccentric bearings) 40. By turning the eccentric metals 40 clockwise or counterclockwise in Fig. 2 by drive of a driving device (fourth driving means) 41, it is possible not only to throw the blanket cylinder 19 on and off the collecting plate cylinder (second cylinder) 22 and the impression cylinder (fourth cylinder) 18, but also to adjust a printing pressure between the blanket cylinder 19 and the impression cylinder 18.

[0027] In detail, the rotation center F1 of the eccentric metals 40 is arranged on the opposite side of the rotation center R1 of the blanket cylinder 19, to a contact point between the blanket cylinder 19 and the collecting plate cylinder 22. The rotation center R1 of the blanket cylinder 19 thereby eccentrically rotates in first and fourth quadrants of an orthogonal coordinate system whose origin is the rotation center F1 of the eccentric metals 40 (that is, on a side in which the blanket cylinder 19 is moved toward and away from both of the impression cylinder 18 and the collecting plate cylinder 22).

[0028] The driving device 41 is disposed below the blanket cylinder 19 and includes a servo motor 41d which is supported on the main unit frame 44 via a bracket (omitted in the drawings), a transmission shaft 41a which transmits rotating force of the servo motor 41d, levers 41b which are formed integrally with the transmission shaft 41a, and rods 41c which are provided between front ends of the levers 41b and flange portions 40a of the eccentric metals 40 and which are rotatably supported by the front ends and the flange portions 40a.

[0029] Furthermore, as illustrated in Figs. 2 and 3, both of left and right end shafts 22a of the collecting plate cylinder 22 are rotatably supported by the pair of left and right main unit frames 44 via a pair of left and right double-eccentric metals each formed of an eccentric inner metal (first eccentric bearing) 42 and an eccentric outer metal (second eccentric bearing) 43.

[0030] By turning the eccentric inner metals 42 clockwise or counterclockwise in Fig. 2 by drive of hydraulic cylinders (first driving means) 45, the collecting plate cylinder 22 can be thrown on and off the collecting blanket cylinder (first cylinder) 21. Moreover, by turning the eccentric outer metals 43 clockwise or counterclockwise in Fig. 2 by drive of a driving device (second driving means) 46, a printing pressure between the collecting plate cylinder 22 and the blanket cylinder 19 can be adjusted.

[0031] In detail, the rotation center M of the eccentric inner metals 42 and the rotation center F2 of the eccentric outer metals 43 are arranged on the opposite side of the rotation center R2 of the collecting plate cylinder 22, to the contact point between the collecting plate cylinder 22 and the blanket cylinder 19. Moreover, the rotation center F2 of the eccentric outer metals 43 is arranged on the opposite side of the rotation center M of the eccentric inner metals 42, to the contact point between the collect-

ing plate cylinder 22 and the collecting blanket cylinder 21. The rotation center R2 of the collecting plate cylinder 22 thereby eccentrically rotates in second and third quadrants of an orthogonal coordinate system whose origin is the rotation center M of the eccentric inner metals 42 or the rotation center F2 of the eccentric outer metals 43 (that is, on a side in which the collecting plate cylinder 22 is moved toward and away from both of the blanket cylinder 19 and the collecting blanket cylinder 21).

[0032] Head portions of the hydraulic cylinders 45 are supported on inner surfaces of the main unit frames 44 to be located above the collecting plate cylinder 22. Flange portions 42a are formed in frame outer peripheral portions of the eccentric inner metals 42 to protrude toward the contact point between the blanket cylinder 19 and the collecting plate cylinder 22. Front ends of piston rods of the hydraulic cylinders 45 are supported by the flange portions 42a.

[0033] Meanwhile, the driving device 46 is disposed below the collecting plate cylinder 22 and includes a servo motor 46d which is supported on the main unit frame 44 via a bracket (omitted in the drawing), a transmission shaft 46a which transmits rotating force of the servo motor 46d, levers 46b which are formed integrally with the transmission shaft 46a, and rods 46c which are provided between front ends of the levers 46b and flange portions 43a of the eccentric outer metals 43 and which are rotatably supported by the front ends and the flange portions 43a.

[0034] In the driving device 46, the pair of left and right eccentric outer metals 43 are driven by one servo motor 46d via the transmission shaft 46a which is horizontally laid between the pair of left and right main unit frames 44 to be turnable.

[0035] Moreover, flange portions 42b are formed in the frame outer peripheral portions of the eccentric inner metals 42 and are each disposed at such a position that the phase thereof is offset from the flange portions 42a by about 90° toward the upper side of the collecting plate cylinder 22. Adjustment bolts (contact portions) 47 are attached to the flange portions 42b, and are screwed to be capable of advancing and retreating in such a direction that the collecting plate cylinder 22 is moved toward and away from the blanket cylinder 19.

[0036] Meanwhile, stoppers (contact members) 49 are disposed on outer sides of the main unit frames 44, above the collecting plate cylinder 22. The stoppers 49 are rotatably supported by the main unit frames 44 via eccentric metals (third eccentric bearings) 48, and the adjustment bolts 47 are configured to be brought into contact with the stoppers 49 when the eccentric inner metals 42 are turned counterclockwise. The printing pressure between the collecting blanket cylinder 21 and the collecting plate cylinder 22 can be thus finely adjusted by turning the eccentric metals 48 when the adjustment bolts 47 and the eccentric metals 48 are in contact with one another, by advancing and retreating the adjustment bolts 47, or by performing both operations.

[0037] The pair of left and right eccentric metals 48 are driven by one servo motor (third driving means) 51 via gears and a transmission shaft 50 which is horizontally laid between the pair of left and right main unit frames 44 to be turnable.

[0038] Accordingly, operations of the cylinder device in the collect printing unit 11 are as follows. First, the eccentric inner metals 42 are turned counterclockwise in Fig. 2 by expanding the hydraulic cylinders 45. The eccentric inner metals 42 are thereby greatly turned up to the point where the adjustment bolts 47 are brought into contact with the stoppers 49 (see the right large arrow in Fig. 2), and the collecting plate cylinder 22 is brought into contact with the collecting blanket cylinder 21.

[0039] Next, the eccentric metals 40 are greatly turned counterclockwise in Fig. 2 by driving the driving device 41 (see the left large arrow in Fig. 2). The blanket cylinder 19 is thereby brought into contact with the impression cylinder 18 and the collecting plate cylinder 22.

[0040] Then, the eccentric metals 40 are slightly turned clockwise or counterclockwise in Fig. 2 by driving the driving device 41 (see the left small arrow in Fig. 2). The printing pressure between the blanket cylinder 19 and the impression cylinder 18 is thereby adjusted according to the thickness of the paper sheet with the throw-on state between the blanket cylinder 19 and the collecting plate cylinder 22 maintained.

[0041] Next, the eccentric metals 48 are turned clockwise or counterclockwise in Fig. 2 by driving the servo motor 51. The eccentric inner metals 42 are thereby slightly turned clockwise or counterclockwise in Fig. 2 (see the right small arrow in Fig. 2), and the printing pressure between the collecting plate cylinder 22 and the collecting blanket cylinder 21 is adjusted. Note that, in this case, the printing pressure between the collecting plate cylinder 22 and the collecting blanket cylinder 21 can be also adjusted by causing the adjustment bolts 47 in the eccentric inner metals 42 to advance or retreat.

[0042] Lastly, the eccentric outer metals 43 are slightly turned clockwise or counterclockwise in Fig. 2 by driving the driving device 46 (see the lower small arrow in Fig. 2). As illustrated in Figs. 4 (a) and (b), the end shafts 22a of the collecting plate cylinder 22 are thereby moved horizontally from the position illustrated by the solid lines to the position illustrated by the broken lines, and the printing pressure between the collecting plate cylinder 22 and the blanket cylinder 19 is adjusted.

[0043] In this case, as illustrated in Fig. 4(c), since the contact state between the stoppers 49 and the flange portions 42b (adjustment bolts 47) of the eccentric inner metals 42 is maintained, the printing pressure between the collecting plate cylinder 22 and the collecting blanket cylinder 21 which has been already set does not change. Specifically, as illustrated in Fig. 4(d), when the eccentric outer metals 43 are rotated about the rotation center F2, an angle between the horizontal line and a section connecting the rotation center R2 of the collecting plate cylinder 22 and the rotation center M of the eccentric inner

metals 42 hardly changes.

[0044] Moreover, in the state where the adjustment bolts 47 and the stoppers 49 are in contact with one another, counterclockwise turning force about the stoppers 49 is constantly applied to the eccentric inner metals 42 by pressing force of the hydraulic cylinders 45.

[0045] As a result, pressing portions where the eccentric inner metals 42 press the eccentric outer metals 43 are formed at the position P1 illustrated in Fig. 2 and pressing portions where the eccentric outer metals 43 press the main unit frames 44 are formed at the position P2 illustrated in Fig. 2. In this case, the pressing portions P1, P2 are located on a substantial extension of a straight line L1 connecting the rotation center R1 of the blanket cylinder 19 and the rotation center R2 of the collecting plate cylinder 22.

[0046] As described above, since the direction in which the eccentric inner metals 42 press the eccentric outer metals 43 and the direction in which the eccentric outer metals 43 press the main unit frames 44 are the same direction (direction in which the collecting plate cylinder 22 is moved away from the blanket cylinder 19), looseness (gaps) among the main unit frames 44, the eccentric outer metals 43, and the eccentric inner metals 42 can be eliminated. Since the movement of the collecting plate cylinder 22 can be thereby restricted, high printing accuracy can be obtained.

[0047] In the cylinder device of the present invention, the collecting plate cylinder 22 are supported by the double eccentric metals having the eccentric inner metals 42 and the eccentric outer metals 43, and the turning of the collecting plate cylinder 22 in a direction in which the collecting plate cylinder 22 is thrown on the blanket cylinder 19 is restricted by bringing the adjustment bolts 47 attached to the eccentric inner metals 42 into contact with the stoppers 49 provided in the main unit frames 44. This enables adjustment of the printing pressure between the collecting plate cylinder 22 and the blanket cylinder 19 with the printing pressure between the collecting plate cylinder 22 and the collecting blanket cylinder 21 maintained. Hence, a printing pressure adjustment mechanism can be achieved in a simple configuration.

[0048] Moreover, since the looseness among the main unit frames 44, the eccentric outer metals 43, and the eccentric inner metals 42 can be eliminated by bringing the adjustment bolts 47 attached to the eccentric inner metals 42 and the stoppers 49 provided in the main unit frames 44 into contact with one another, high printing accuracy can be obtained.

[0049] Note that the cylinder device of the present invention is not limited to the cylinder device of the embodiment described above, and various changes such as changes in the numbers of the transfer cylinders and the partial plate cylinders, changes in the cylinder arrangement, and changes in the driving means of the eccentric metals can be made within the scope not departing from the spirit of the present invention as a matter of course. Moreover, the cylinder device of the present invention

can be applied, not only to the collect printing press, but also to other printing presses.

INDUSTRIAL APPLICABILITY

[0050] The cylinder device for the printing press in the present invention can perform highly-accurate printing pressure adjustment for at least in three cylinders in a simple configuration. The present invention can be thus effectively applied to printing of securities and the like.

EXPLANATION OF THE REFERENCE NUMERALS

[0051]

11	collect printing unit
12	double-sided offset printing unit
18	impression cylinder (fourth cylinder)
19	blanket cylinder (third cylinder)
20	partial plate cylinder
21	collecting blanket cylinder (first cylinder)
22	collecting plate cylinder (second cylinder)
23	ink supplying device
40	eccentric metal (fourth eccentric bearing)
41	driving device (fourth driving means)
42	eccentric inner metal (first eccentric bearing)
43	eccentric outer metal (second eccentric bearing)
44	main unit frame (supporting member)
45	hydraulic cylinder (first driving means)
46	driving device (second driving means)
47	adjustment bolt (contact portion)
48	eccentric metal (third eccentric bearing)
49	stopper (contact member)
51	servo motor (third driving means)
F1	rotation center of eccentric metals
F2	rotation center of eccentric outer metals
R1	rotation center of blanket cylinder
R2	rotation center of collecting plate cylinder
M	rotation center of eccentric inner metals
L1	straight line connecting rotation center of blanket cylinder and rotation center of collecting plate cylinder
P1, P2	pressing portion

Claims

1. A cylinder device for a printing press, comprising:
 - a second cylinder supported on a pair of supporting members to be capable of being moved toward and away from a first cylinder and a third cylinder;
 - a pair of first eccentric bearings by which both end portions of the second cylinder are rotatably supported and which move the second cylinder toward and away from the first cylinder by being

turned;
 first driving means for turning the pair of first eccentric bearings;
 a pair of second eccentric bearings by which the pair of first eccentric bearings are pivotally supported and which moves the second cylinder toward and away from the third cylinder by being turned, the pair of second eccentric bearings pivotally supported by the pair of supporting members;
 second driving means for turning the pair of second eccentric bearings;
 contact members which are provided in the pair of supporting members; and
 contact portions which are provided in the pair of first eccentric bearings and which are brought into contact with the contact members when the second cylinder is brought into contact with the first cylinder by drive of the first driving means.

2. The cylinder device for a printing press according to claim 1, **characterized in that** the contact members are such that turning amounts of the first eccentric bearings when the contact members are in contact with the contact portions are capable of being adjusted.

3. The cylinder device for a printing press according to claim 1, **characterized in that** a rotation center of the first eccentric bearings and a rotation center of the second eccentric bearings are disposed on an opposite side of a rotation center of the second cylinder, to a contact point between the second cylinder and the third cylinder, and the rotation center of the second eccentric bearings is arranged on an opposite side of the rotation center of the first bearings, to a contact point between the first cylinder and the second cylinder.

4. The cylinder device for a printing press according to claim 1, **characterized in that**, in a state where the contact members and the contact portions are in contact with each other, force about the contact members is constantly applied to the first eccentric bearings by the first driving means in a direction in which the second cylinder is moved away from the third cylinder, and the first eccentric bearings and the second eccentric bearings press the second eccentric bearings and the supporting members, respectively, in a direction of a substantial extension of a straight line connecting a rotation center of the third cylinder and a rotation center of the second cylinder.

5. The cylinder device for a printing press according to claim 1, **characterized in that** the third cylinder is supported by the supporting members via a fourth eccentric bearing which is turned by fourth driving

means.

6. The cylinder device for a printing press according to claim 5, **characterized in that** the cylinder device further comprises a fourth cylinder supported to be capable of being moved toward and away from the third cylinder, wherein turning by the fourth driving means enables adjustment of a printing pressure between the third cylinder and the fourth cylinder, in addition to throwing the third cylinder on and off the second cylinder and throwing the third cylinder on and off the fourth cylinder.

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FIG. 1

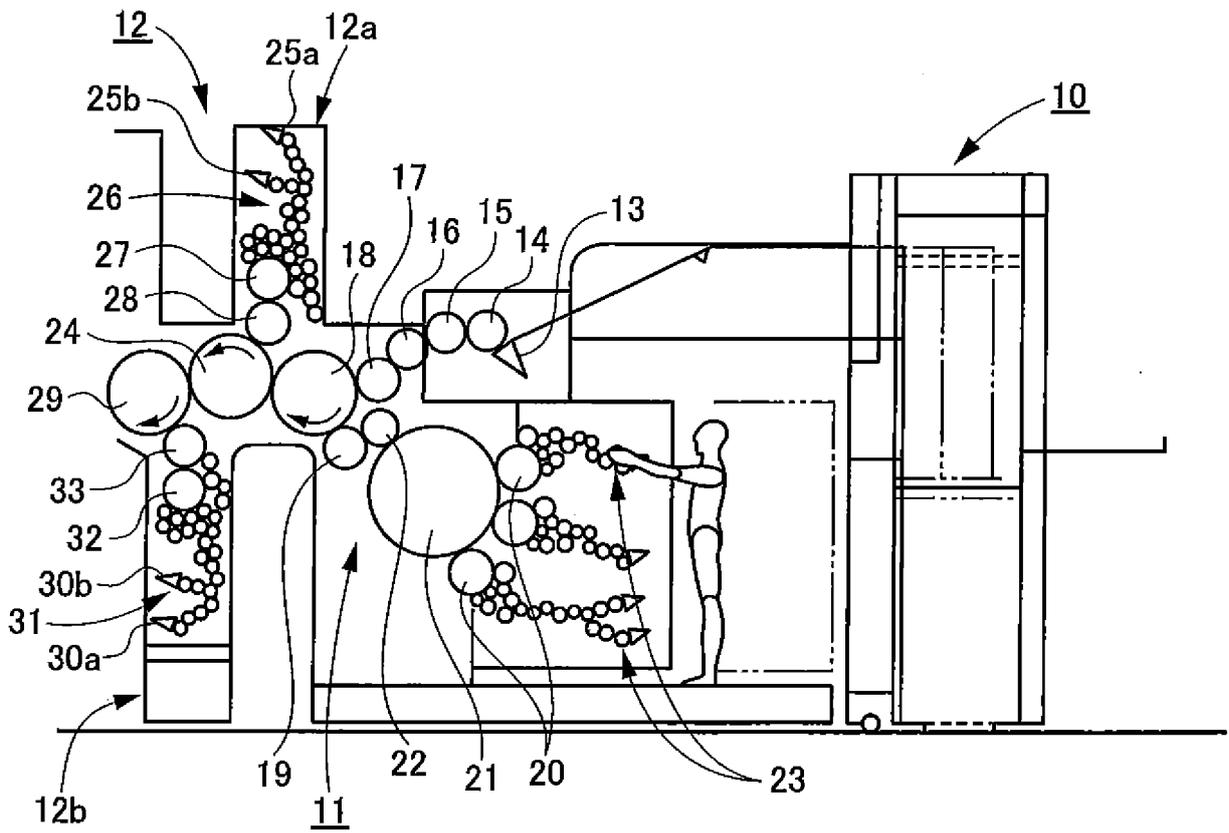


FIG.2

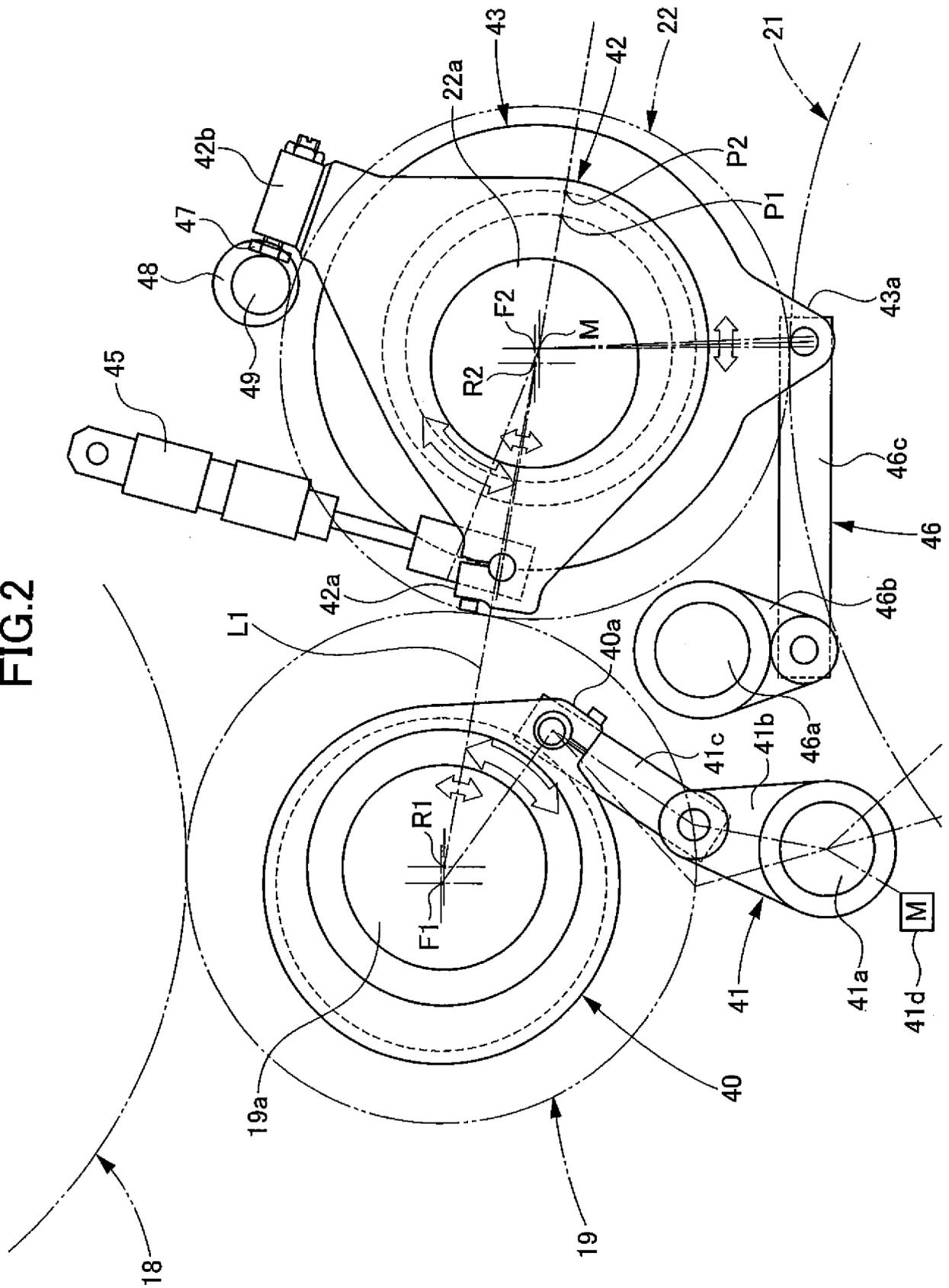


FIG.3

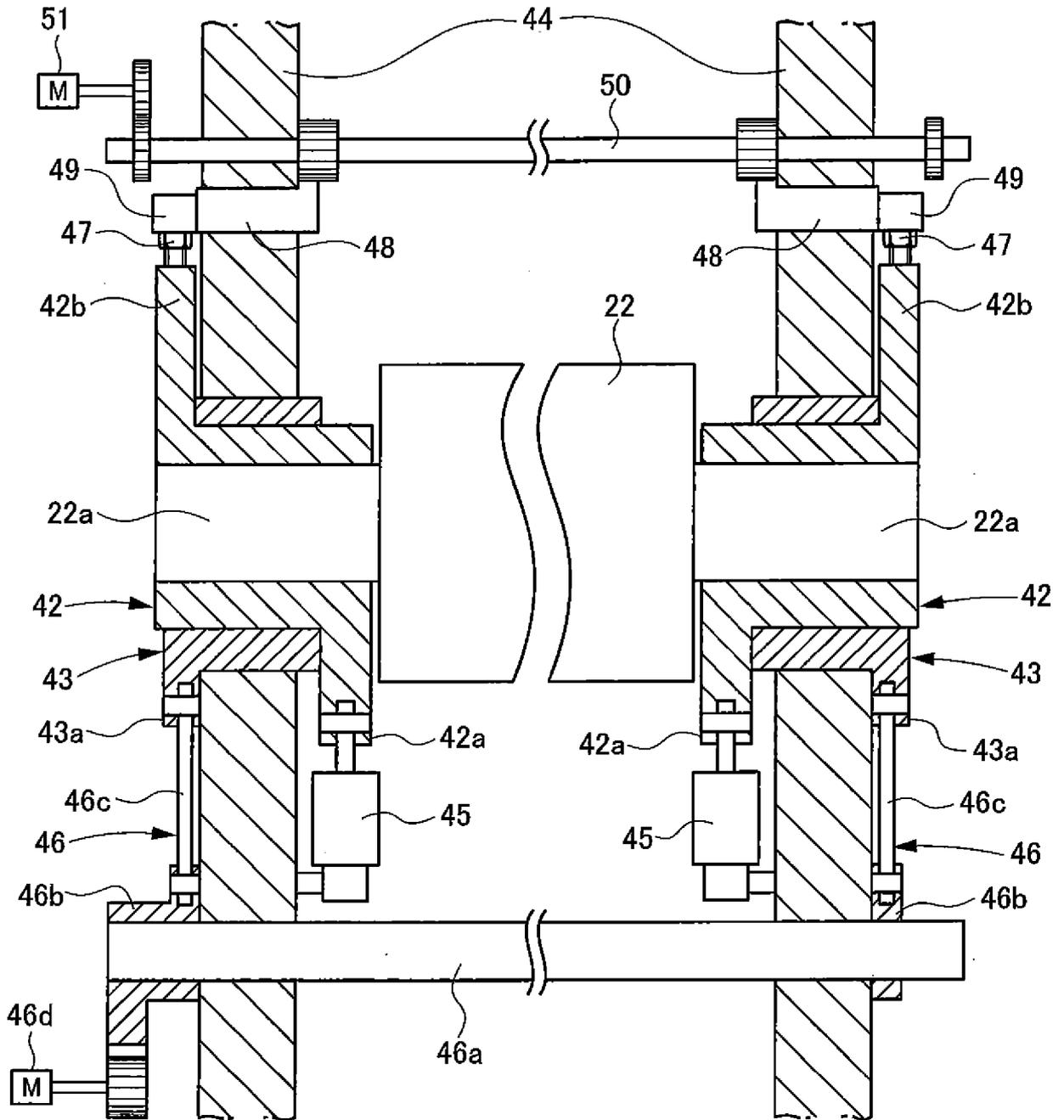


FIG.4(a)

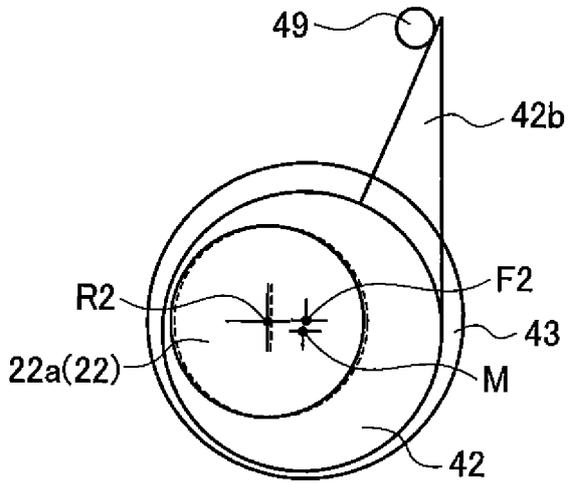


FIG.4(b)

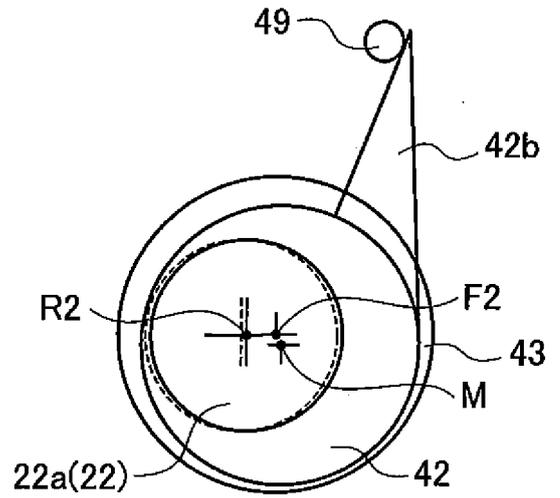


FIG.4(c)

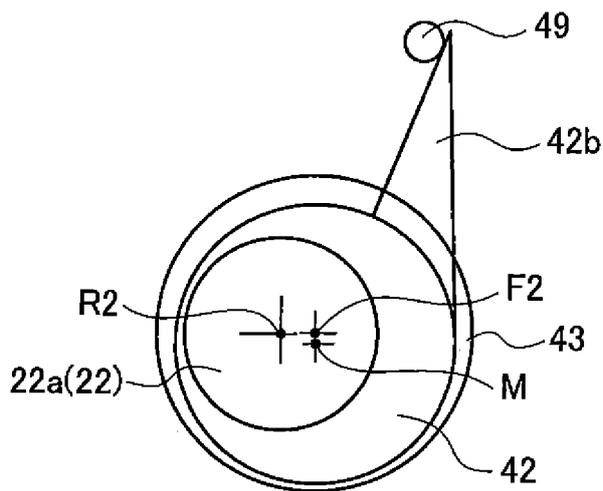
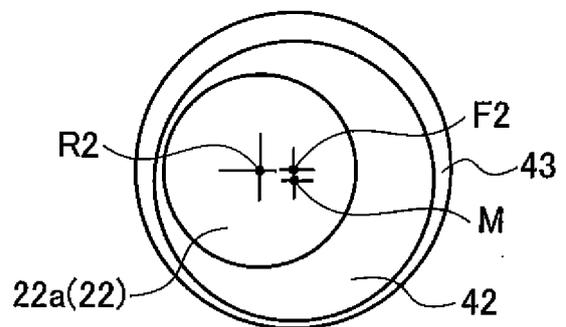


FIG.4(d)



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2015/062924

5	A. CLASSIFICATION OF SUBJECT MATTER B41F13/28(2006.01)i, B41F11/02(2006.01)i, B41F13/24(2006.01)i										
	According to International Patent Classification (IPC) or to both national classification and IPC										
10	B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) B41F13/28, B41F11/02, B41F13/24										
15	Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2015 Kokai Jitsuyo Shinan Koho 1971-2015 Toroku Jitsuyo Shinan Koho 1994-2015										
	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)										
20	C. DOCUMENTS CONSIDERED TO BE RELEVANT										
	<table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;">25</td> <td> A JP 2004-148726 A (Ryobi Ltd.), 27 May 2004 (27.05.2004), claim 1; paragraphs [0014] to [0047] & US 2004/0083911 A1 & DE 10350584 A & CN 1498751 A </td> <td style="vertical-align: top;">1-6</td> </tr> <tr> <td style="vertical-align: top;">30</td> <td> A JP 2002-1904 A (Komori Corp.), 08 January 2002 (08.01.2002), claim 1; paragraphs [0008] to [0021] & US 2001/0054361 A1 & EP 1167027 A2 & DE 60129886 T & AT 369981 T & ES 2291247 T </td> <td style="vertical-align: top;">1-6</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	25	A JP 2004-148726 A (Ryobi Ltd.), 27 May 2004 (27.05.2004), claim 1; paragraphs [0014] to [0047] & US 2004/0083911 A1 & DE 10350584 A & CN 1498751 A	1-6	30	A JP 2002-1904 A (Komori Corp.), 08 January 2002 (08.01.2002), claim 1; paragraphs [0008] to [0021] & US 2001/0054361 A1 & EP 1167027 A2 & DE 60129886 T & AT 369981 T & ES 2291247 T	1-6	
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35	<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.										
40	<table border="0"> <tr> <td style="vertical-align: top;">45</td> <td> * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> </tr> </table>		45	* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family						
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50	Date of the actual completion of the international search 27 May 2015 (27.05.15)	Date of mailing of the international search report 09 June 2015 (09.06.15)									
55	Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Authorized officer Telephone No.									

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2015/062924

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 62-257847 A (MAN Roland Druckmaschinen AG), 10 November 1987 (10.11.1987), claims; page 2, lower right column, line 19 to page 3, lower right column, line 14 & US 4833982 A & EP 242661 A2 & DE 3614027 A & DE 3770325 D	1-6

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REFERENCES CITED IN THE DESCRIPTION

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- JP HEI7291 B [0004]
- JP 4611493 B [0004]