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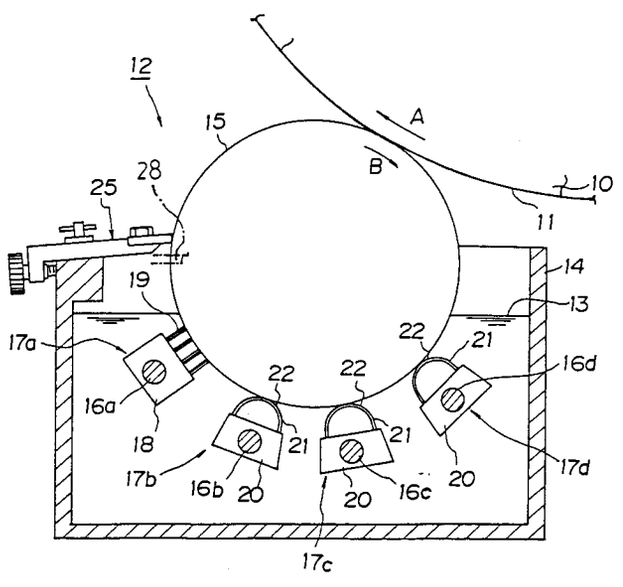
(54) Wiping apparatus of intaglio printing press.

(57) A wiping apparatus 12 comprising a wiping roll 15 and cleaning members 17a to 17d for cleaning the peripheral surface of the wiping roll 15, some of the cleaning members 17a to 17d consisting of a base 20 disposed along the longitudinal direction of the roll and a sheet pad 21 which is curved in an arch form and secured to this base 20 in the direction of rotation of the roll, and has a multitude of tiny openings 23 for scraping ink in a top section 22 in elastic contact with at least the peripheral surface of the wiping roll.

Fig. 1



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BACKGROUND OF THE INVENTION

[Field of the Utilization]

The present invention relates to a wiping apparatus of an intaglio printing press for wiping off excess ink from an intaglio plate surface.

[Description of the Prior Art]

Printing by the use of an intaglio printing press is performed by transferring ink to the surface of an intaglio plate cylinder, and then by transferring the ink from the printing image section to paper being fed between the intaglio plate cylinder and an impression cylinder after wiping off the ink from other than a printing image area by use of a wiping roll rotating in contact with the surface of the plate cylinder. The wiping roll is rotating partly immersed in the cleaning solution of trichloroethylene in the cleaning solution tank, in which cleaning members extending in the longitudinal direction of the roll are mounted in contact with the peripheral surface of the wiping roll. The ink thus transferred to the wiping roll by wiping operation, therefore, will be removed by these cleaning member plus the cleaning solution, being dissolved in the cleaning solution.

As the construction of a cleaning member used in such a wiping apparatus, a prior-art cleaning member shown in Fig. 4 is known (refer to Japanese Patent Publication No. Hei 2-8585 filed by the present applicant).

That is, there are arranged several cleaning members 3 in the circumferential direction of the wiping roll 2 for scraping excess ink wiped from the intaglio plate cylinder, off from the wiping roll, each cleaning member 3 consisting of brush units 4 which have a plurality of rows of bristle groups 4a set in the brush units 4, with their top positioned close to the periphery of the wiping roll 2, and are supported on the solution tank 5 side, and cleaning sheets 6 produced of unwoven synthetic-fiber cloth supported on the brush units 4, and located between the periphery of the wiping roll 2 and the top of the bristles of the bristle groups 4a.

In the prior-art wiping apparatus as described above, however, the cleaning effect of the cleaning sheets 6 serving as wiper pads will decrease at a fast rate because of the consumption of an abrasive material attached to the unwoven cloth caused by friction with the wiping roll 2, embrittlement and consumption of a resin used to attach the abrasive material to the unwoven cloth, and permanent set of the elastic unwoven cloth itself resulting from pressure application to the wiping roll 2. Also, the ink scraped off from the wiping roll 2 gradually accumulates inside the unwoven cloth of the cleaning sheet 6, resulting in a loaded cleaning sheet. There is present such a disadvantage that, after the completion of printing operation, it will become necessary to take it into consideration the removal of the whole cleaning member 3 out of the cleaning solution tank 5 and washing of the cleaning sheet 6. For preventing the loading of the cleaning sheet 6 of the cleaning member 3, a means to decrease the thickness of the cleaning sheet 6 is conceivable. This, however, excessively deteriorates the durability of the cleaning member 3.

It is, therefore, an object of the present invention to provide a wiping apparatus of an intaglio printing press capable of improving cleaning capacity and durability and decreasing cleaning operation.

Summary of the Invention

To attain the above-described object, the wiping apparatus of the present invention comprises a wiping roll which is driven to rotate in a cleaning solution tank while transferring ink from the surface of an intaglio printing plate cylinder, and cleaning members disposed in contact with the surface of the wiping roll inside the solution tank for cleaning the surface of the wiping roll with the cleaning solution. In this wiping apparatus, the cleaning member consists of a base arranged along the longitudinal direction of the roll, and arched sheet pads each fixed on the base and having a multitude of tiny openings for scraping ink, in the top section in elastic contact with the peripheral surface of the wiping roll.

According to the wiping apparatus of the aforesaid constitution, the ink transferred by wiping from the intaglio printing plate cylinder to the wiping roll is scraped positively and finely by means of a multitude of tiny openings made in the sheet pads and is dissolved in the cleaning solution.

The arched pads which are fixed to the bases, having elasticity, are provided with a specific contact width at the top section and are pressed against the peripheral surface of the wiping roll in order to improve cleaning capacity.

The above and other objects, features and advantages of the present invention will become more obvious from the following description when taken in connection with the accompanying drawings which show, for purposes of illustration, preferred embodiments in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional view of one embodiment of a wiping apparatus according to the present invention;

Fig. 2 is an expanded view of a sheet pad of the same;

Fig. 3 is a sectional view of another embodiment of the wiping apparatus of the present invention; and

Fig. 4 is a sectional view of a prior-art wiping apparatus.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter preferred embodiments of a wiping apparatus according to the present invention will be explained with reference to the accompanying drawings.

Fig. 1 is a sectional view showing one embodiment of a wiping apparatus according to the present invention; and Fig. 2 is an expanded view of a sheet pad of she same.

In Fig. 1, between the right and left machine frames at the printing part, there is axially supported an intaglio plate cylinder 10 rotating in the direction of the arrow A in the drawing. On the periphery of this Plate cylinder 10 is mounted an intaglio plate 11 having a printing image area which is sunk.

12 (in Fig. 1) shows a unitized wiping apparatus, which is supported on a bracket (not illustrated) on the machine frame side and equipped with a long box-like solution tank 14 which holds a cleaning solution 13.

The solution tank 14 mentioned above contains the cleaning solution 13, in which a wiping roll 15 is axially supported with its lower half immersed, rotating in the direction of the arrow B opposite to the direction of rotation of the intaglio plate cylinder, with its peripheral surface in contact with the intaglio plate 11, and reciprocating in the longitudinal direction.

Between plural sets of arms not illustrated which are longitudinally rockably supported on both the right and left of the solution tank 14, four support shafts 16a to 16d of nearly the same length as the wiping roll 15 are rotatably mounted at a specific spacing in the circumferential direction of the roll. Supported on these shafts 16a to 16d are cleaning members 17a to 17d respectively.

Of the cleaning members 17a to 17d , the cleaning member 17a situated on the most downstream side in the direction of rotation of the roll and rotatably fitted on the shaft 16a consists of a base 18 extended in the longitudinal direction of the roll and plural rows of bristle groups 19 set in the base with the top end of the bristles held in elastic contact with the peripheral surface of the wiping roll 15, thus forming a so-called brush unit.

Three other cleaning members 17b to 17d comprise a base 20 rotatably mounted on the shafts 16b to 16d and extended in the longitudinal direction of the roll, and a sheet pad 21 secured in an arched form to the base 20 in the direction of rotation of the roll.

The sheet pad 21, as shown in Fig. 2, is made of an about 0.15 to 0.25 mm-thick steel strip of carbon tool steel (SK steel) and has a multitude of about 1 to 1.5 mm-diameter tiny openings 23 of staggered arrangement in the top section 2 which is in elastic contact with the peripheral surface of the wiping roll 15. In Fig. 2 a numeral 24 refers to positioning notch.

On the solution tank 14 previously stated are mounted a doctor 25 having a scraper for removing the cleaning solution from the peripheral surface of the wiping roll 15, and scraping members 28 having a scraper for removing the cleaning solution from both ends of the wiping roll in order to prevent the cleaning solution from spreading to the intaglio printing surface and other parts of the machine. Should the cleaning solution be allowed to transfer to the intaglio printing cylinder 10, the ink on the intaglio printing surface would be dissolved, resulting in such printing troubles as thinned ink and scattering of the cleaning solution out of the solution tank.

Because of the above-described constitution of the wiping apparatus, the ink is transferred by the inking arrangement to the intaglio printing area and other of the intaglio plate 11 on the intaglio printing cylinder 10, and the ink in other than the printing area is wiped off by the wiping roll 15 rotating in the opposite direction of the printing cylinder 10, attaching onto the surface of the wiping roll 15.

The lower half part of the wiping roll 15 is immersed in the cleaning solution 13, with the immersed surface being in contact with the four cleaning members 17a to 17d; and therefore the ink transferred by wiping from the printing cylinder surface to the wiping roll surface is effectively removed by means of three sheet pads 21 and the plural rows of bristle groups 19. That is, the ink is positively and finely scraped by pressing the sheet pads 21 through the tiny openings 23 and also removed by brushing by means of the bristle groups 19. The ink thus scraped off is rapidly dispersed and dissolved in the cleaning solution 13.

The wiping roll 15 thus cleaned of ink is rotating with only the cleaning solution 13 on the roll surface. The cleaning solution 13, however, is scraped off the roll surface by means of the doctor 25, while the wiping roll 15 continues ink wiping operation.

The contact pressure of the aforesaid four cleaning members 17a to 17d is adjusted in a similar manner as prior-art techniques by rocking plural sets of arms not illustrated. Also, one-sided

pressure application can be similarly prevented as in a prior art by a known means not illustrated for solving the problem of one-sided pressure application.

In the present embodiment, the pad 21, produced of a steel sheet, will never be loaded with ink in the small openings 23 and accordingly the cleaning capacity of the cleaning solution will never be decreased. Therefore, the pad 21, unlike conventional ones, will never require cleaning to remove ink loading. Furthermore, since the small openings 23 are of little diameter, the ink that has once passed the pads 21 is slimy without recoagulation and can readily be dissolved in the cleaning solution 13.

Furthermore, since the pad 21, produced of a steel sheet, has a remarkably prolonged (twice longer) life as compared with the conventional unwoven cloth pad. The material of the pad 21 should not be limited only to the steel sheet but may be a sheet having equal properties (alkali resistance, wear resistance, and appropriate elasticity) and provided with a multitude of tiny openings, whereby similar effect can be obtained.

The pad 21, made of a sheet curved to a specific form, elastically contacts the wiping roll surface, thereby obtaining a specific width of contact. In addition, it is unnecessary to firmly press the brushes from under the unwoven cloth unlike prior arts notwithstanding the use of the pad 21 produced of a steel sheet. Therefore, directly under the pad 2 is present the cleaning solution, with which excess ink scraped down from the wiping roll 15 and forced out through the tiny openings comes into contact to dissolve at a rapid rate. The excess ink thus removed will never accumulate on the cleaning members 17b to 17d making up a cleaning unit, thereby enabling the simplification of cleaning operation.

The number of the cleaning members 17a to 17d and the arrangement of the small openings 23 in the sheet pad 21 are not limited to the illustrated example.

Next, Fig. 3 is a sectional view showing another exemplary embodiment of the wiping apparatus according to the present invention.

In this example the solution tank 14 does not hold the cleaning solution 13; the cleaning solution 13 is jetted out against the peripheral surface of the wiping roll 15 from the nozzle holes of injection pipes 26a to 26d arranged along the support shafts 16a to 16d.

To each of the injection pipes 26a to 26d, the cleaning solution 13 is delivered through branch pipes from an injection device not illustrated. The injection pipes 26a to 26d are provided with a number of nozzle holes arranged in the longitudinal direction of the roll and directed so as to jet out the cleaning solution 13 to the area where the sheet pads 21 are in contact with the wiping roll 15. In this drawing a numeral 27 refers to a drain plug.

According to the present embodiment, because no cleaning solution is carried around at both ends of the wiping roll 15, the scraping member (refer to the numeral 28 in Fig. 1) becomes unnecessary to thereby enable the high-speed rotation of the roll and accordingly the high-speed operation of the machine.

Also there is such an advantage that since the excess ink scraped with the tiny openings 23 of the pad 21 will be blown off by the use of a jet, the cleaning capacity can be enhanced and there will occur no trouble of loading of the tiny openings 23.

The cleaning capacity and durability of the sheet pads 21 are the same as the embodiment previously described.

In the aforesaid embodiment, a similar effect can be obtained by mounting the injection pipes 26a to 26d inside of the sheet pads 21.

The present invention is not to be limited only to the wiping apparatus with the wiping roll 15 held in direct contact with the intaglio plate cylinder 10, but may be applied to the apparatus with the wiping roll 15 rotating in contact with the intaglio plate cylinder 10 through several rolls.

According to the present invention, as described above, the cleaning member held in contact with the wiping roll comprises a base disposed along the longitudinal direction of the roll, and a sheet pad provided with a multitude of tiny openings for scraping the ink in the top section in elastic contact at least with the peripheral surface of the roll, arched in the direction of rotation of the roll, and secured to the base. It is, therefore, possible to provide a wiping apparatus of an intaglio printing press having an improved cleaning capacity and durability and to reduce cleaning operation.

The present invention has been described in detail with particular reference to preferred embodiments thereof but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

Claims

1. A wiping apparatus of an intaglio printing press having a wiping roll driven to rotate in a cleaning solution tank to wipe off ink from an intaglio plate surface of an intaglio plate cylinder, and cleaning members for cleaning with a cleaning solution the peripheral surface of said wiping roll disposed in said cleaning solution tank, in contact with the peripheral surface of said wiping roll, said wiping apparatus, comprising: a base arranged along the longitudinal direction of said roll, and sheet pads curved and fixed in

a form of arch to said bases, each having a multitude of tiny openings for scraping ink, at least in the top section in elastic contact with the peripheral surface of said wiping roll.

2. A wiping apparatus of an intaglio printing press as claimed in claim 1, wherein the lower part of said wiping roll is immersed in a cleaning solution insaid cleaning solution tank.

3. A wiping apparatus of an intaglio printing press as claimed in claim 1, wherein said cleaning solution is jetted out from a nozzle of an injection pipe to the periphery of said wiping roll.

4. A wiping apparatus of an intaglio printing press as claimed in claim 1, wherein said sheet pad is a strip produced of about 0.15 to 0.21 mm thick steel.

5. A wiping apparatus of an intaglio printing press as claimed in claim 1, wherein said tiny openings are selected to be about 1 to 1.5 mm in diameter and arranged in a staggered manner.

Fig. 1

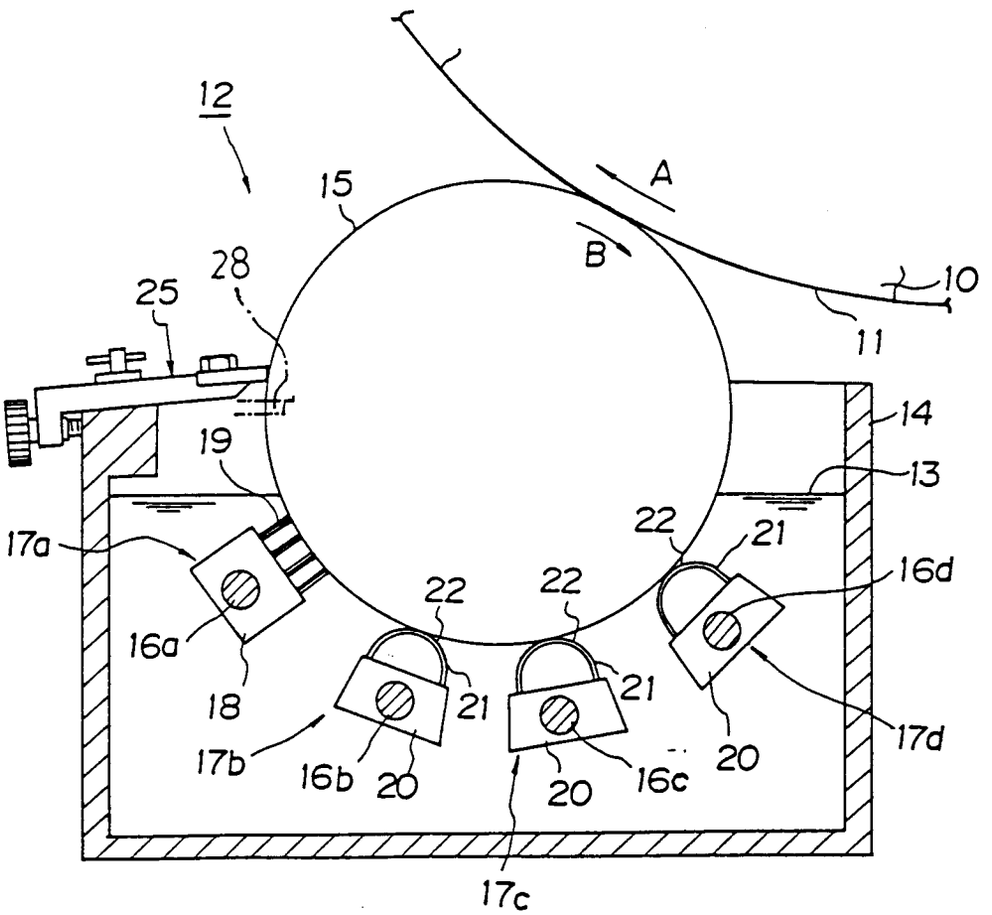
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Fig. 2

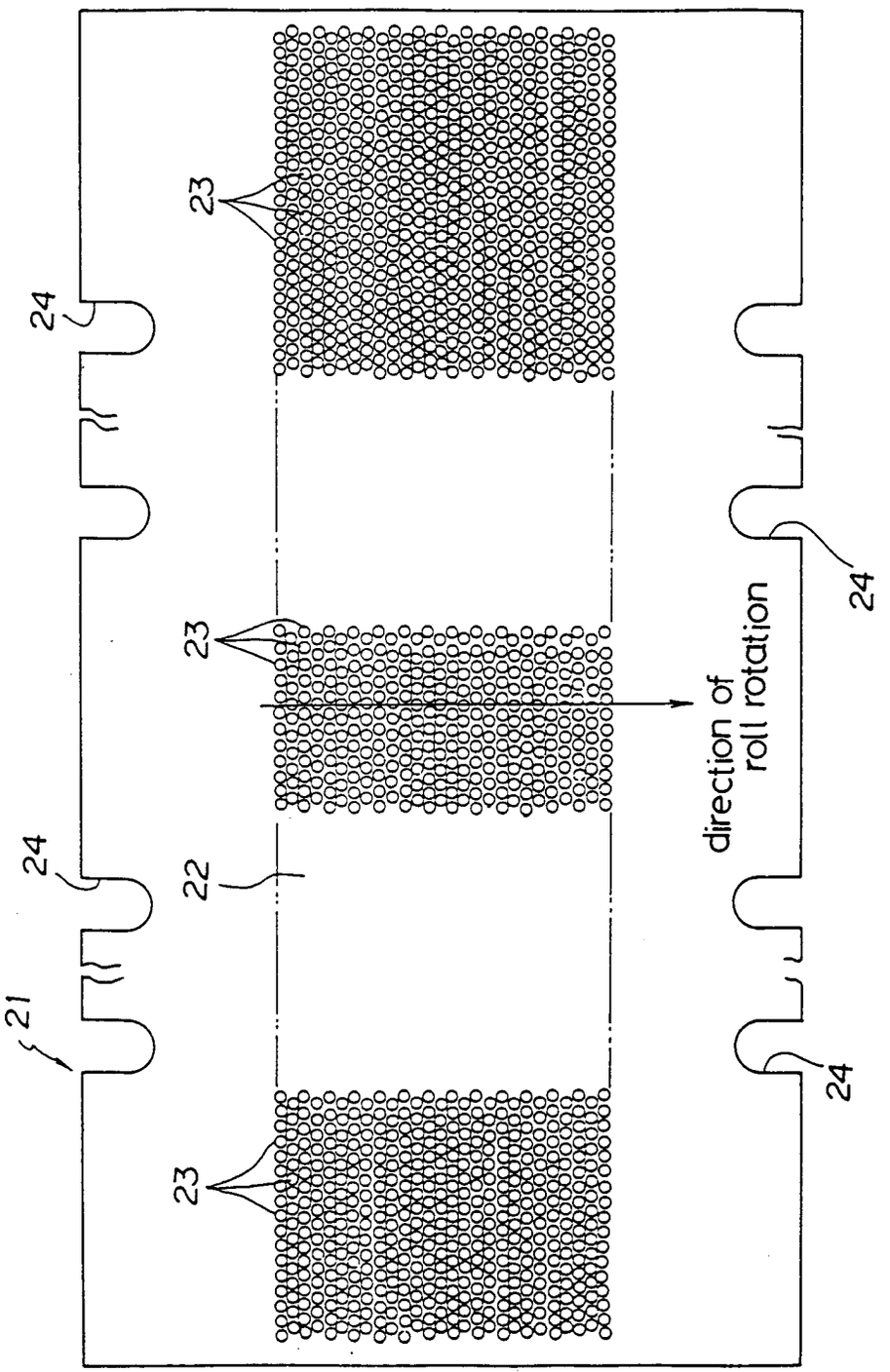

Fig. 3

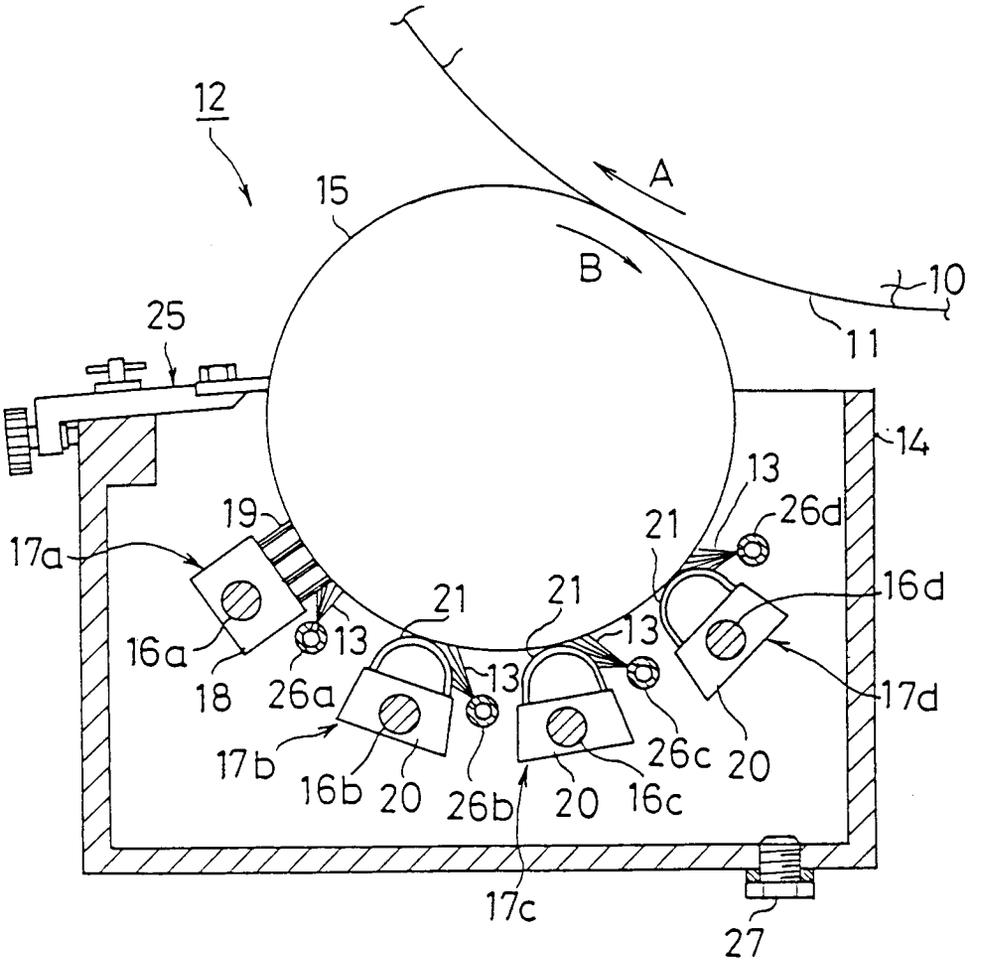
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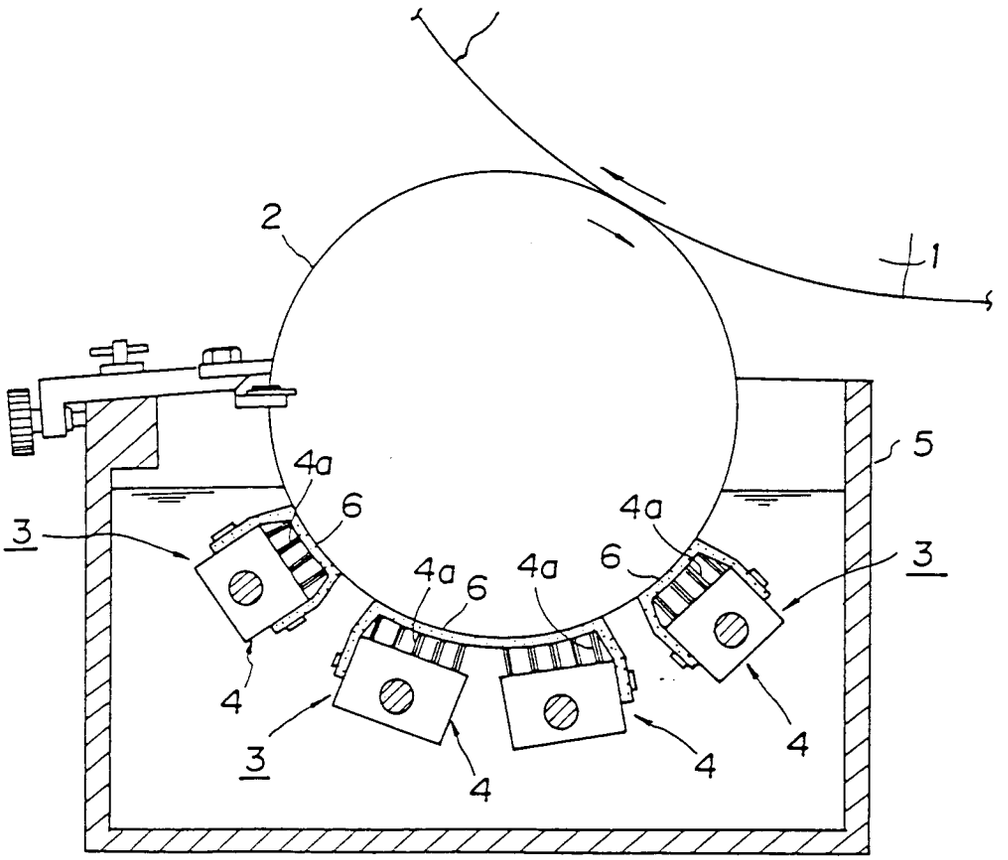
Fig. 4



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EUROPEAN SEARCH REPORT

Application Number

EP 92 10 8068

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)
A	PATENT ABSTRACTS OF JAPAN vol. 7, no. 203 (M-241)(1348) 8 September 1983 & JP-A-58 101 061 (KOMORI INSATSU KIKAI K. K.) 16 June 1983 * abstract * -----	1,2	B41F9/10
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B41F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 AUGUST 1992	MADSEN P.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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