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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 belt-like cleaning cloth (6) and a detector (15). The cleaning cloth kept in a taut traveling state is pressed against the circumferential surface of a rotating printing cylinder/roller (1), to clean the circumferential surface of the printing cylinder/roller. The detector includes a detecting member (8b) to be pressed against the cleaning cloth in the taut traveling state to detect loosening of the cleaning cloth on the basis of a movement of the detecting member.

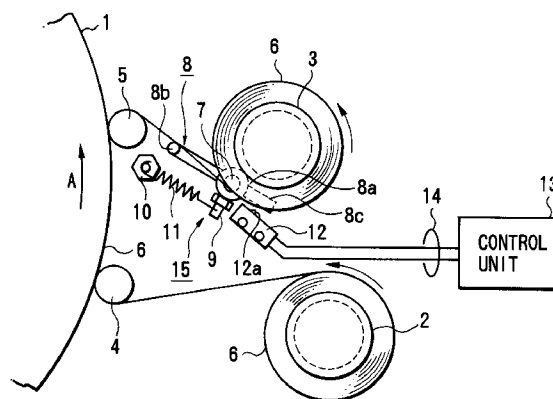


FIG.1

Background of the Invention

The present invention relates to a printing cylinder/roller cleaning apparatus in various types of printing presses, 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.

Each of various types of printing presses, e.g., an offset printing press and an intaglio printing press, has printing cylinders, e.g., a plate cylinder, a blanket cylinder, an impression cylinder, and a transfer cylinder, and rollers, e.g., a form roller and a vibrating roller. During the printing operation, foreign matters, e.g., ink dust and paper dust are attached to the circumferential surfaces of these printing cylinders and rollers and degrade the quality of the printed matter. Hence, a cleaning apparatus is provided for cleaning the printing cylinders and rollers to remove the foreign matters.

A printing cylinder/roller cleaning apparatus of this type has rewinding and take-up shafts for a cleaning cloth, e.g., an unwoven fabric. The two end portions of each of the rewinding and take-up shafts are rotatably supported by the bearings of the apparatus frame. When the blanket cylinder is, for example, to be cleaned, the rewinding and take-up shafts move close to the circumferential surface of the blanket cylinder and extend in the axial direction thereof. A pad constituted by an elastic member, which is movable forward and backward in the radial direction of the blanket cylinder so as to move close to and apart from the circumferential surface of the blanket cylinder, is provided between the rewinding and take-up shafts as it is supported by a holder. Thus, the cleaning cloth, e.g., an unwoven fabric taken up by the rewinding shaft in a separate process travels as it is intermittently rewound and taken up by the take-up shaft. The traveling cleaning cloth is pressed by the pad against the circumferential surface of the blanket cylinder between the rewinding and take-up shafts. Hence, the foreign matters attaching to the circumferential surface of the blanket cylinder are transferred to the cleaning cloth and removed together with the cleaning cloth, and the cleaning cloth is taken up by the take-up shaft.

In such a printing cylinder/roller cleaning apparatus, however, when the cleaning cloth is adhesively attached to the blanket surface of the blanket cylinder by some cause, e.g., the viscosity of the ink, and is torn, the torn end of the cleaning cloth might be caught in the rotating blanket cylinder to cause a serious accident. In order to prevent this, a rotary encoder is mounted on the end portion of the rewinding shaft, and tearing of the cleaning cloth is detected from a change in rotational speed, thereby informing the user of the accident. However, it takes time after

the tearing is detected and before the printing press is stopped by a signal indicating this. The cleaning cloth may be caught in the blanket cylinder during this period of time. Also the structure is complicated.

In order to solve these drawbacks, in an apparatus disclosed in Japanese Patent Laid-Open No. 63-286350, a cutter is provided in the vicinity of the traveling path of the cleaning cloth to be almost perpendicular to the traveling direction of the cleaning cloth. When the cleaning cloth is torn by some cause and is caught in the blanket cylinder, or when the cleaning cloth is caught in the blanket cylinder due to the adhesive force of the ink, although it is not torn, a tension is applied between the rewinding shaft and the blanket cylinder to cut the cleaning cloth with the cutter, thereby preventing occurrence of an accident. In this case, it is also possible to stop the printing press by detecting pivotal movement of the cutter, after the cleaning cloth is cut, with a limit switch or the like. According to another proposal, no cutter is provided, but the abnormal tension of the cleaning cloth is detected only by a limit switch, and the printing press is stopped, thereby preventing occurrence of an accident.

However, in the conventional printing cylinder/roller cleaning apparatus as described above, the tension of the cleaning cloth is utilized in either the case wherein the cleaning cloth is to be cut by the cutter, the case wherein the cleaning cloth is cut by the cutter and the pivotal movement of the cutter is detected by the limit switch, or the case wherein no cutter is provided and the abnormal tension of the cleaning cloth is detected by the limit switch, and the like. Therefore, some time, even though only little, is required before cutting or detecting, and the loss of the cleaning cloth is inevitable.

In either the case wherein the cleaning cloth is to be cut by the cutter or the case wherein the cleaning cloth is cut by the cutter and the pivotal movement of the cutter is detected by the limit switch, when the cleaning cloth is caught in the blanket cylinder by the viscosity of the ink without being torn, the cleaning cloth is cut by the cutter. Therefore, the take-up shaft must be replaced, requiring much labor and degrading the operability of the printing press.

Furthermore, when the cleaning cloth is cut by the cutter and the pivotal movement of the cutter is not detected by the limit switch, the operator does not notice that the cleaning cloth is cut but notices it only after he or she observes the blanket cylinder. Then, in a multicolor printing press, after all the printing units are cleaned, the blanket cylinder of the printing unit that caused the accident must be cleaned again. This prolongs the preparation time and degrades the operability of the printing press. In the cleaning apparatus in which the pivotal movement of the cutter is detected by the limit switch after the cleaning cloth is cut by the cutter, as described above, the number of constituent components is increased, and an inexpensive

cleaning apparatus cannot be provided.

Summary of the Invention

It is an object of the present invention to provide a printing cylinder/roller cleaning apparatus for a printing press, which can eliminate catching of a cleaning cloth in the printing cylinder with a simple structure.

In order to achieve the above object, according to the present invention, there is provided a printing cylinder/roller cleaning apparatus for a printing press, comprising a belt-like cleaning cloth, kept in a taut traveling state, pressed against a circumferential surface of a rotating printing cylinder/roller, for cleaning the circumferential surface of the printing cylinder/roller, and a detector, including a detecting member to be pressed against the cleaning cloth kept in the taut traveling state, for detecting loosening of the cleaning cloth on the basis of a movement of the detecting member.

Brief Description of the Drawings

Fig. 1 is a side view of a printing cylinder/roller cleaning apparatus in a state wherein the cleaning cloth is taut; and

Fig. 2 is a side view of the printing cylinder/roller cleaning apparatus in a state wherein the cleaning cloth is loosened.

Description of the Preferred Embodiment

Figs. 1 and 2 show a printing cylinder/roller cleaning apparatus according to the present invention which is applied to clean a blanket cylinder as a printing cylinder. Fig. 1 shows a state wherein the cleaning cloth is taut, and Fig. 2 shows a state wherein the cleaning cloth is loosened. Referring to Figs. 1 and 2, a hollow rewinding (supply) shaft 2 and a take-up shaft 3 are disposed in the vicinity of a blanket cylinder 1. The rewinding and take-up shafts 2 and 3 extend in the axial direction of the blanket cylinder 1, and each of them has two end portions rotatably and detachably supported by the support portions of the apparatus frame (not shown). A pair of guide rollers 4 and 5 each having two ends rotatably, axially supported by the bearings of the apparatus frame are pressed against the circumferential surface of the blanket cylinder 1 through a cleaning cloth 6.

The belt-like cleaning cloth 6 constituted by, e.g., an unwoven fabric is fully wound on the rewinding shaft 2 in a separate process, and the rewinding shaft 2 is mounted on the apparatus frame. The cleaning cloth 6 wound on the rewinding shaft 2 is guided to the guide roller 4 and then to the take-up shaft 3 through the guide roller 5. The take-up shaft 3, which is initially mounted on the apparatus frame in an empty state, is intermittently rotated as it is driven by a

driving unit (not shown), so that it takes up the cleaning cloth 6 guided from the guide roller 5.

An L-shaped lever 8 serving as a detecting member is supported on a support pin 7, which is located in the vicinity of one end of the take-up shaft 3 and extends on the apparatus frame, to be swingable about its boss portion 8a. The lever 8 has, on its one free end portion, a bent piece 8b bent parallel to the axial direction of the blanket cylinder 1. The bent piece 8b is in contact with the rear surface of the cleaning cloth 6 traveling between the guide roller 5 and the take-up shaft 3 in the taut state. A tension spring 11 extends between a spring catch 9 provided on the boss portion 8a of the lever 8 and a spring catch 10 extending on the apparatus frame. The tension spring 11 applies a pivotal force to the lever 8 in a direction (clockwise direction in Fig. 1) to press the bent piece 8b of the lever 8 against the rear surface of the cleaning cloth 6.

In the vicinity of the boss portion 8a of the lever 8, a normally open limit switch 12, connected to a controller 13 through a wiring 14 and having a contact 12a which is open in the normal state, is fixed to the apparatus frame such that its contact opposes the other free end portion 8c of the lever 8. The lever 8, the tension spring 11, and the limit switch 12 constitute a detector 15. The contact 12a of the limit switch 12 partly constituting the detector 15 is closed by the swing movement of the lever 8 when the cleaning cloth 6 is loosened, as shown in Fig. 2. Then, the controller 13 performs a control operation to stop rotation of the printing press.

The cleaning operation by the printing cylinder/roller cleaning apparatus having the arrangement as described above will be described. When the printing operation is ended and the circumferential surface of the blanket cylinder 1 is to be cleaned, the blanket cylinder 1 is rotated in a direction indicated by an arrow A in Fig. 1, and the take-up shaft 3 is intermittently pivoted to cause the cleaning cloth 6 to travel intermittently. The foreign matters, e.g. ink dust and paper dust attaching to the surface of the blanket cylinder 1 are transferred to the cleaning cloth 6 to be removed with it. The cleaning cloth 6 is then taken up by the take-up shaft 3 with the foreign matters attaching to it. When the cleaning cloth 6 on the rewinding shaft 2 runs out, the empty rewinding shaft 2 is replaced with a rewinding shaft on which a cleaning cloth is fully wound in a separate process. The take-up shaft 3 on which the soiled cleaning cloth 6 is wound is replaced with an empty take-up shaft. During the printing operation, the whole cleaning apparatus is retracted from the blanket cylinder 1 and stored.

During the cleaning operation, the cleaning cloth 6 is kept taut, and the bent piece 8b of the lever 8 is urged by the cleaning cloth 6 against the tension of the tension spring 11, as shown in Fig. 1. When the

cleaning cloth 6 is torn by some cause, or adhesively attaches to the circumferential surface of the blanket cylinder 1 by the viscosity of the ink, it tends to be caught in the blanket cylinder 1. In this case, since the cleaning cloth 6 is loosened, as shown in Fig. 2, the lever 8, together with the bent piece 8b, is pivoted by the tension of the tension spring 11 in the clockwise direction in Fig. 2. As a result, the free end portion 8c of the lever 8 urges the contact 12a of the limit switch 12 to close the circuit. Thus, upon reception of an output from the contact 12a, the controller 13 stops rotation of the printing press, thereby preventing an accident in which the cleaning cloth 6 is caught in the blanket cylinder 1. In this case, the time period after the cleaning cloth 6 is torn and before rotation of the printing press is stopped is very short.

In this embodiment, the entire detector 15 is provided on the rear side of the cleaning cloth 6, and the contact 12a of the limit switch 12 is provided as a normally open contact, so that the contact 12a is closed when an abnormality occurs. However, the contact 12a of the limit switch 12 may be provided as a normally closed contact, so that the contact 12a is open in an abnormal state. Even if the entire detector 15 is provided on the front surface side of the cleaning cloth 6, a normally open limit switch can be used by changing the position of the limit switch 12.

In this embodiment, the contact 12a of the limit switch 12 is opened/closed by the free end portion 8c of the lever 8. However, a projection or recess hole may be formed in the boss portion 8a of the lever 8, and the contact 12a of the limit switch 12 may be opened/closed by the projection or recess hole.

Furthermore, an actuator may be provided to the limit switch 12 such that its free end portion directly contacts the cleaning cloth 6, thereby detecting the loose state of the cleaning cloth 6.

This embodiment exemplifies a case in which the present invention is applied to the blanket cylinder as a printing cylinder. However, the present invention can similarly be applied to an impression cylinder, a transfer cylinder, a paper discharge cylinder, and the like which are printing cylinders other than the blanket cylinder so as to obtain the same effect.

In this embodiment, the cleaning cloth 6 is pressed against the circumferential surface of the blanket cylinder or the like by the guide rollers 4 and 5. However, the cleaning cloth may be pressed against the circumferential surface of the blanket cylinder or the like by a pad, as is disclosed in Japanese Patent Laid-Open No. 63-286350 described above.

As is apparent from the above description, according to the present invention, in a printing cylinder/roller cleaning apparatus for a printing press which cleans the circumferential surface of the printing cylinder or roller by pressing a cleaning cloth intermittently traveling in the taut state against the circumferential surface of the printing cylinder or roller,

a detector is provided to detect the loose state of the cleaning cloth by pressing a detecting member against the traveling cleaning cloth. Therefore, the time period after the detecting member detects the loose state of the cleaning cloth and before rotation of the printing press is stopped can be greatly shortened, catching of the cleaning cloth in the printing cylinder or roller can be prevented to prevent occurrence of an accident, thereby improving the safety, and the consumption of the cleaning cloth can be decreased. In addition, unlike in the conventional apparatus, since no unit is required for cutting the cleaning cloth when the cleaning cloth is loosened, the structure is simplified, and the apparatus can be provided at a low cost.

Claims

1. A printing cylinder/roller cleaning apparatus for a printing press, characterized by comprising:
 - a belt-like cleaning cloth (6), kept in a taut traveling state, pressed against a circumferential surface of a rotating printing cylinder/roller (1), for cleaning the circumferential surface of the printing cylinder/roller; and
 - a detector (15), comprising a detecting member (8b) to be pressed against said cleaning cloth in the taut traveling state, for detecting loosening of said cleaning cloth on the basis of a movement of said detecting member.
2. An apparatus according to claim 1, wherein said detector comprises a spring member (11) for biasing said detecting member to be pressed against said cleaning cloth, and switching means (12) for detecting the movement of said detecting member from loosening of said cleaning cloth.
3. An apparatus according to claim 2, wherein said detecting member comprises a pivot lever having a first free end portion (8b) and a second free end portion (8c), said first free end portion being bent in a direction perpendicular to a traveling direction of said cleaning cloth to be pressed against said cleaning cloth, and said second free end portion operating said switching means upon pivotal movement of said pivot lever caused by loosening of said cleaning cloth.
4. An apparatus according to claim 1, further comprising a supply shaft (2) for supplying said cleaning cloth, press members (4, 5) for pressing said cleaning cloth supplied from said supply shaft against the circumferential surface of the printing cylinder/roller, and a take-up shaft (3) for taking up said cleaning cloth guided from said press members, and wherein said detecting member is

pressed against said cleaning cloth traveling between said press members and said take-up shaft.

5. An apparatus according to claim 4, wherein said press members comprise a pair of guide rollers pressed against the circumferential surface of the printing cylinder/roller. 5
6. An apparatus according to claim 1, further comprising a controller (13) for stopping rotation of the printing press by a detection output from said detector. 10

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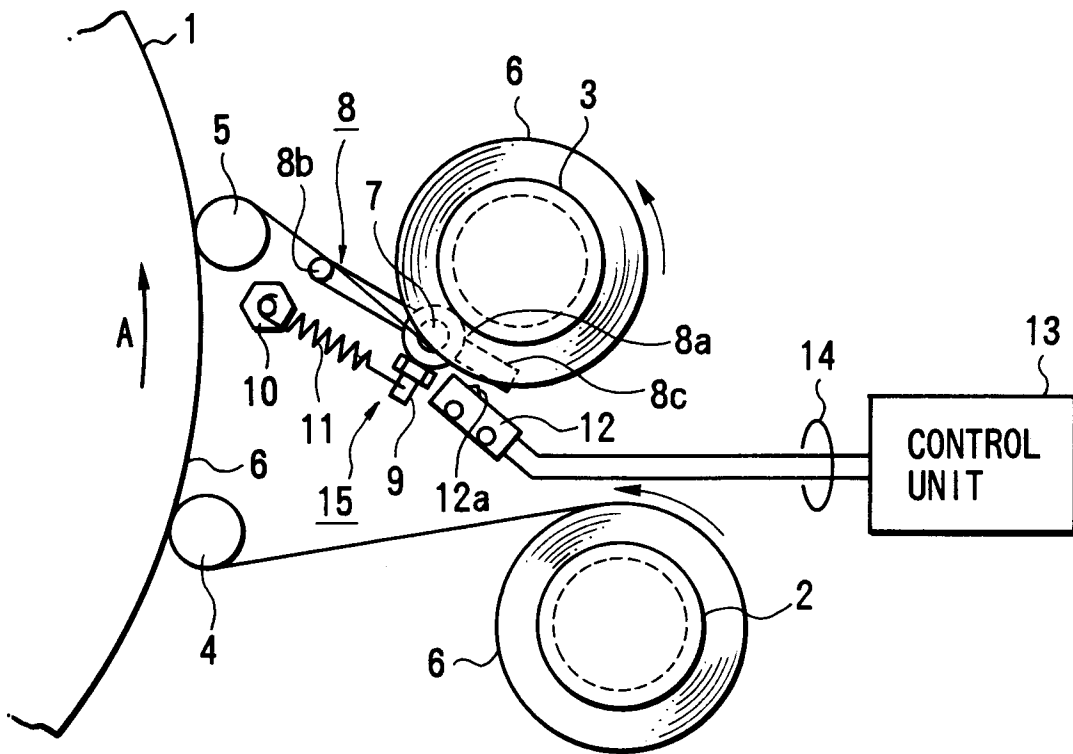


FIG.1

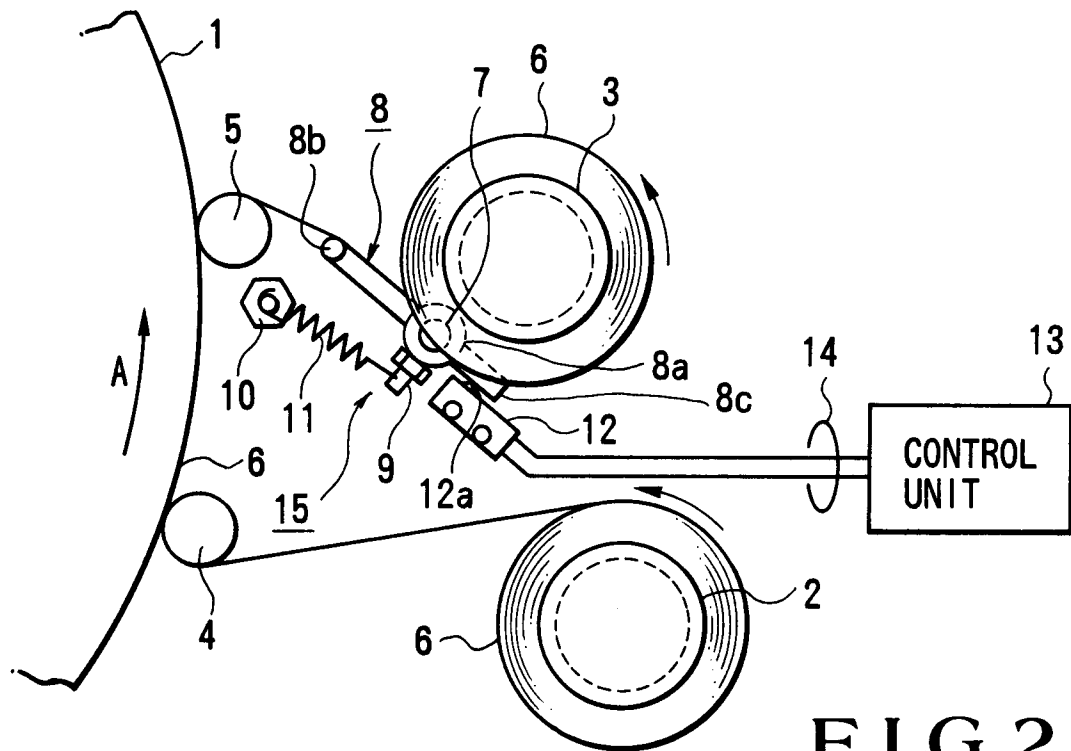


FIG.2



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 25 0026

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-0 291 745 (BALDWIN-JAPAN) * column 7, line 2 - line 53; figure 5 *	1-4, 6	B41F35/00
Y	US-A-1 776 104 (CAVANAUGH) * the whole document *	1-4, 6	
A	DE-C-71 387 (PETER LUHN) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B41F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 APRIL 1993	Examiner LONCKE J.W.
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