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DEVICE FOR THE CLEANING OF SHEET-TRANSFER CYLINDERS IN ROTARY PRINTING PRESSES

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(56) Prior Art Documents
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US 4393778

(57) Claim

1. Device for cleaning outer cylindrical surfaces in a sheet-fed rotary printing machine, including a roller which is engageable with the outer cylindrical surface, wherein said roller is assigned to an ink repelling, textured outer cylindrical surface of a sheet-conveying cylinder or drum, said roller is positioned so as to be in engagement with the outer cylindrical surface of the cylinder or drum in the non-sheet-conveying area, and said roller has an ink-absorbing and ink-storing effect.

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Complete Specification for the invention entitled:

DEVICE FOR THE CLEANING OF SHEET-TRANSFER CYLINDERS IN ROTARY PRINTING PRESSES

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The following statement is a full description of this invention, including the best method of performing it known to applicant(s):

Device for the cleaning of sheet-transfer cylinders in rotary printing presses.

The invention relates to a device for the cleaning of the textured outer cylindrical surface of a sheet-transfer cylinder in a sheet-fed rotary printing press. Considerable problems are caused by the occurrence of smears in sheet-transfer cylinders between two successive printing units and also in back-pressure cylinders in a verso printing unit of a sheet-fed rotary printing press. This results in particular from the, in some cases, very elaborate attempts at a solution that are disclosed in the relevant literature. Even if a very quick-drying ink is used, it is not possible reliably to ensure that the printing ink that has been applied in the recto printing unit is sufficiently dry by the time that it comes into contact with the outer cylindrical surface of the cylinder that transfers the sheet to the next printing unit or, in the case of a verso printing unit, even on the back-pressure cylinder itself, with the result that there is a slight, print-quality-reducing build-up of ink on the outer cylindrical surface of the cylinder. In order to prevent this phenomenon, sheet-transferring cylinders of this kind have been covered with an aluminium plate, this plate being grained, anodized, sand-blasted or otherwise surface-roughened, to produce an ink-repellent surface. A further method has been to provide the cylinders with paper carriers that are covered with an adhesive containing imbedded glass beads. It has not been possible, however, to overcome the problem by this means.

In another known design, the sheet-transfer cylinder is fitted with rubber blankets that are coated on one side with glass beads, but which must be cleaned several times a day, because there is a build-up of ink, above all on the rubber between the glass beads, this resulting in a smearing of the print. Practical application has been found for the special fabric described in EP-A 0 059 944, which is disposed on the sheet-transfer cylidner with limited freedom of movement and which compensates the movement of the paper relative to the cylinder, said movement arising amongst other things from the changing curvature of the sheet. Such a fabric must be replaced when it reaches a certain level of soiling, but such

replacement is difficult to perform, time-consuming and costly. In the printing of certain qualities of paper, for example smooth cardboard, the desired effect does not occur, so that the hoped-for result involves a certain risk, which is further increased by damage to the fabric that does not become immediately apparent. Moreover, UV inks, as they dry, tend to adhere to this fabric, with the result that its use in connection with UV inks considerably increases the risk.

DE-PS 12 58 873 describes a cylinder surface made out of chrome-plated aluminium sheet with a surface roughness that lies within certain limits. Cylindrical surfaces formed in the latter manner can only be manufactured at considerable expense and are tied to precisely fixed cylinder diameters, so that the unwound aluminium sheet can be fixed on the cylinder body with an exact fit.

Moreover, such sheet-transfer cylinders must be cleaned by hand at fairly frequent intervals using a solvent or cleaning agent, for which purpose the printing press has to be stopped.

On the other hand raised-textured outer cylindrical surfaces of sheet-transfer cylinders are known from DE-OS 24 46 188 and other publications. This measure, too, serves to furnish the sheet-transfer cylinder with an outer cylindrical surface that attracts only a small quantity of ink and in so doing counteracts the problem of smearing.

The object of the invention is to furnish a sheet-fed rotary printing press with one or more printed-sheet-transferring cylinders of the initially named kind with a device that requires little time to be set up and that guarantees over a long running period and with a high degree of operational reliability smear-free sheet transport through the use of relatively simple and dependable components.

With this in mind, the present invention provides a device for the cleaning of the textured outer cylindrical surface of a sheet-transfer cylinder in a sheet-fed rotary printing press, wherein in the non-sheet-conducting region, a co-rotating cleaning device is assigned to the cylinder, said cleaning device being replaceably held in the printing press and being able to be brought into engagement with the outer cylindrical surface of the cylinder.

With this in mind, the present invention provides device for cleaning outer cylindrical surfaces in a sheet-fed rotary printing machine, including a roller which is engageable with the outer cylindrical surface, wherein said roller is assigned to an ink repelling, textured outer cylindrical surface of a sheet-conveying cylinder or drum, said roller is positioned so as to be in engagement with the outer cylindrical surface of the cylinder or drum in the non-sheet-conveying area, and said roller has an ink-absorbing and ink-storing effect.

In the design of said features according to the invention, preferably a rotatingly-driven roller is used, said roller being easily replaceable, for example being held on the side walls of the housing by means of known plug-in connector elements and being connectible to a drive. Such a roller may be used in connection with differently formed outer cylindrical surfaces of the sheet-transferring cylinder and may likewise be correspondingly designed so that the cylinder for example may be covered with a glass bead blanket or may, in known manner, comprise a textured surface of chromium nickel or similar. Suitable for the cleaning roller itself are brush rollers of known design, if appropriate with spirally disposed rows of bristles, said brush rollers having an ink-accepting and ink-storing effect. Foam rubber rollers with a plush cover may also be suitable, with it being necessary, possibly by experiment, to determine which type of roller produces the better effect for a given surface of the cylinder. In place of said roller, a cleaning strip may also be provided, said strip unwinding during the cleaning process from one roll and winding up again onto another roll. Since the features according to the invention can be implemented not only in simple sheet-transfer cylinders, but also, if necessary, in cylinders with several sheet-transfer surfaces or back-pressure cylinders, it will be necessary to select the specific design of cleaning device to suit the operating conditions in order to achieve the optimum effect. In order to improve the desired effect, it is suggested that the roller or similar is driveable at a circumferential speed that is different from, advantageously lower than, that of the cylinder, with the result that a wiping motion occurs on the circumference of the cylinder. This difference in circumferential speed between the roller and the cylinders can be achieved by means of an electrical or mechanical drive, if necessary via additional control elements. With the same objective, the cleaning roller may also be driven in the opposite direction to the cylinder.

In order to suit the printing operation that is to be performed, the cleaning roller may be either permanently in engagement, rotating at a circumferential speed that is different from that of the cylinder, or may be only

temporarily in engagement, possibly at pre-determined intervals, with it being possible for said intervals to be defined in a control program for the, preferably electrical, drive of the roller. Moreover, the control of the drive may also include the possibility of axial movement of the roller during rotation, in order to enhance the wiping effect during the cleaning of the surface of the cylinder.

In some cases, however, it will be sufficient for the cleaning roller to be brought into engagement only at fairly long intervals with the outer cylindrical surface of the sheet-transferring cylinder, for example only in the evening when printing is interrupted.

The roller is replaced as soon as the cleaning effect appears impaired. This may happen at different intervals depending on the printing operation and, in order to be able to perform said replacement as far as possible without interruption of printing and without loss of time, the previously mentioned mounting of the roller by quick-fitting coupling elements is of particular significance.

The cleaning effect is enhanced by impregnation of the roller surface or by the supply of cleaning agents, with the result that the roller ~~according to claim 5~~ employs such a cleaning agent, solvent or similar. Use may be made of rollers to which a liquid cleaning agent is supplied by an internal system of channels or via a special application roller or in a similar manner as soon as the roller is brought into engagement with the outer cylindrical surface of the cylinder. In this case in particular the roller may be disposed below an extraction hood so that the cleaning agent as well as the loosened dirt particles are continuously extracted.

In order to explain the invention in more detail specimen embodiments are represented diagrammatically in the drawings, in which:

Fig. 1 shows the side view of part of a rotary printing press;

Fig. 2 shows an enlarged detail of the textured outer cylindrical surface of a sheet-transfer cylinder;

Fig. 3 shows a top view of a specimen embodiment of a roller of the cleaning device with partial sections of the housing of the printing press; and

Fig. 4 shows a top view corresponding to Fig. 2 of a further specimen embodiment.

Fig. 1 shows a 3-cylinder sheet-transfer arrangement between the two impression cylinders 1 and 2 of two successive printing units. The freshly printed sheet 3 is accepted by the first sheet-transfer cylinder 4 from the impression cylinder 1 of the first printing unit and is passed to the sheet-transfer cylinder 5, the diameter of which is appreciably larger. The sheet-transfer cylinder 6 passes the sheet taken from cylinder 5 to the impression cylinder 2 of the adjacent printing unit. Provided in this embodiment for cleaning the outer cylindrical surface of the two sheet-transferring cylinders 4 and 6 - which comprise a grained, anodized, sand-blasted or otherwise roughened surface texture (shown on an enlarged scale in Fig. 2) - are cleaning devices, each consisting of one roller 7 or 8, which are rotatably held in the side walls 12 and 13 of the housing by means of eccentric bearing elements 24 and 25, swivel arms or similar. The arrangement shown enables the roller to be brought into engagement with the outer cylindrical surface of the cylinder 4, as is shown in the case of the roller 7, and for the roller to brought out of engagement, as is shown for the roller 8, by a rotation of the bearing elements 24 and 25. Illustrated in the right-hand half of Fig. 1 is the arrangement of a roller 7 below an extraction hood 9 with a suction-air connection 10. The form arrangement and holding of the rollers 7 and 8 is illustrated in Fig. 2 and 3. Fig. 3 shows a brush roller 8, the bristles 11 of which are randomly disposed, advantageously, however, in the form of a spiral, so that bristles 11 of the cleaning roller 8 touch all surface areas of the outer cylindrical surface of the cylinder 4 or 6, when the roller 8 is in engagement. The rollers 7 or 8 of the cleaning device are held in the side walls 12 and 13 of the housing of the printing press by means of pivot pins 14 and 15.

Fig. 3 shows a mechanical drive with a gear wheel 16 that penetrates the gearing unit of the printing press drive and which sets the pivot pin 15 in rotation via a transmission gear 26, preferably a toothed belt or similar. Fig. 4, on the other hand, shows an electric drive by a separate electric motor 17. Other forms of drive are possible. Provided for the quick replacement of the rollers 7 or 8 are quick-fitting coupling elements, which are designed in the manner of known plug-in type couplings. In the embodiment according to Fig. 3, a plug-in pin 18, provided at one end of the roller 8, engages an axial bore-hole of the pivot pin 15, with the reverse process occurring at the opposite end, so that the pivot pin 14 engages an axial bore-hole 27 of the roller hub 8, with the pivot pin 14 being axially displaceable against the action of a spring 19, in order to release the coupling elements from one another. A ring 20 fixed to the pivot pin 14 engages with a pin 21 a bore-hole on the end face of the roller 8 and thus establishes a non-rotatable connection between the pivot pin 14 and the roller 8, with the result that the pivot pin rotates in the bearing element 24.

Fig. 4 shows similar coupling elements of a quick-fitting coupling, in which the roller 8 with its axial bore-hole 27 can be pushed against the action of the spring 19 onto the pivot pin 14 in order in this manner to withdraw the plug-in pin 18 at the opposite end out of a sleeve 22 that is non-rotatably connected to the pivot pin 15.

Other design means for the guiding and movement of the rollers 7 and 8 for the purpose of engagement and disengagement are known and for this reason are not illustrated individually in the drawings. Should in place of the described brush rollers soft rubber rollers with a plush cover be used, it is recommended for the purpose of wear reduction that the grippers 23 are closed briefly as they pass the roller 8 or 7, as is indicated in Fig. 1 below the roller 8.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. Device for cleaning outer cylindrical surfaces in a sheet-fed rotary printing machine, including a roller which is engageable with the outer cylindrical surface, wherein said roller is assigned to an ink repelling, textured outer cylindrical surface of a sheet-conveying cylinder or drum, said roller is positioned so as to be in engagement with the outer cylindrical surface of the cylinder or drum in the non-sheet-conveying area, and said roller has an ink-absorbing and ink-storing effect.

2. Device according to claim 1, wherein said roller is rotary driven and mounted so as to be easily exchangeable.

3. Device according to claims 1 or 2, said roller is driveable at a peripheral speed which is deviating from and lower than the peripheral speed of said cylinder, or countercurrently.

4. Device according to any preceding claim, wherein said roller of the cleaning device has a controllable drive for its rotation.

5. Device according to any preceding claim, wherein said roller is arranged under a suction hood having a suction air connection.

6. Device according to any preceding claim, wherein said roller has quick-fitting couplings at both ends thereof.

7. Device according to any preceding claim, wherein said roller is insertable at both ends into bearings by means of a plug-in connection which is disconnectible by an axial movement against a spring.

8. Device substantially as hereinbefore described with respect to what is shown in the accompanying drawings.

DATED: 8 August 1991

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Fig.1

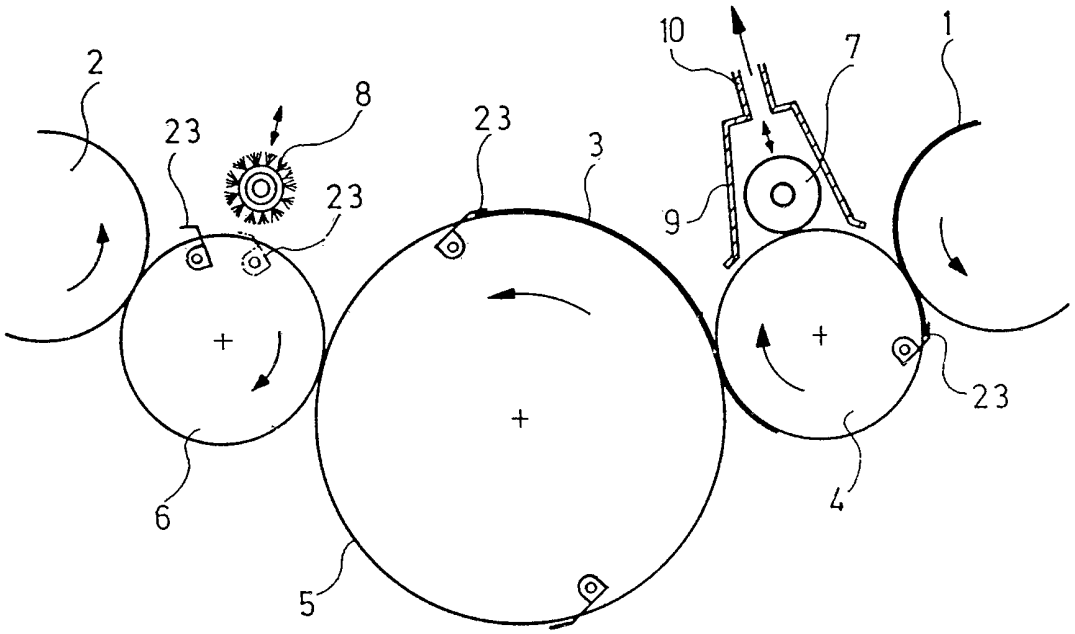

Fig. 2

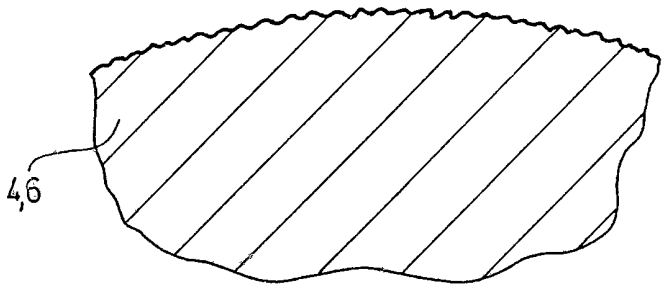

Fig. 3

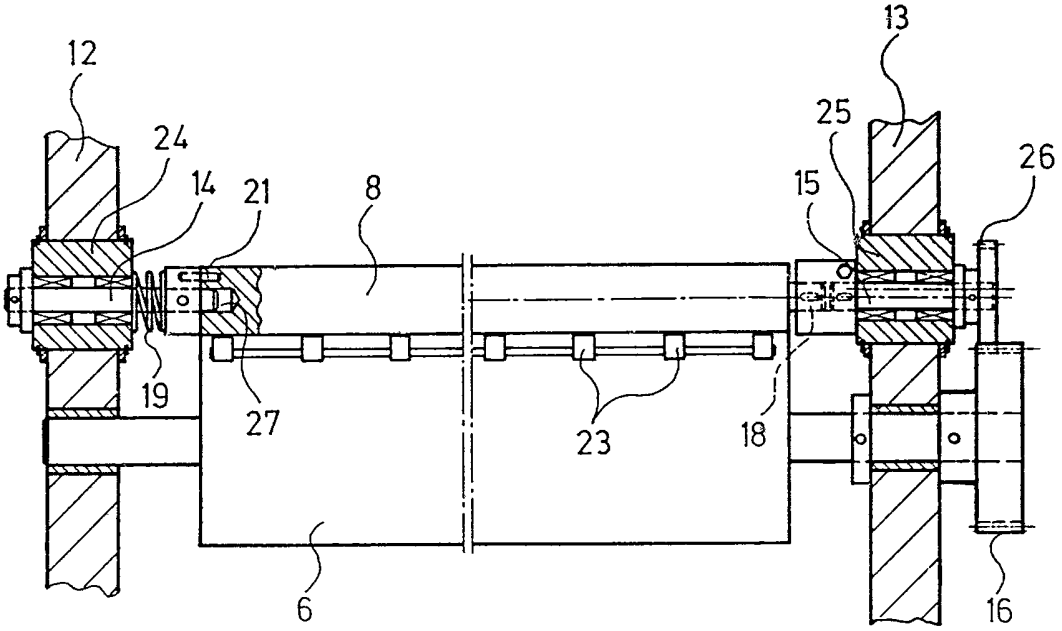

Fig. 4