

[54] **APPARATUS FOR AUTOMATICALLY CLEANING THE BLANKET CYLINDER OF AN OFFSET PRINTER**

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[58] Field of Search **101/423, 424, 425, 148, 101/352; 15/256.51, 256.52**

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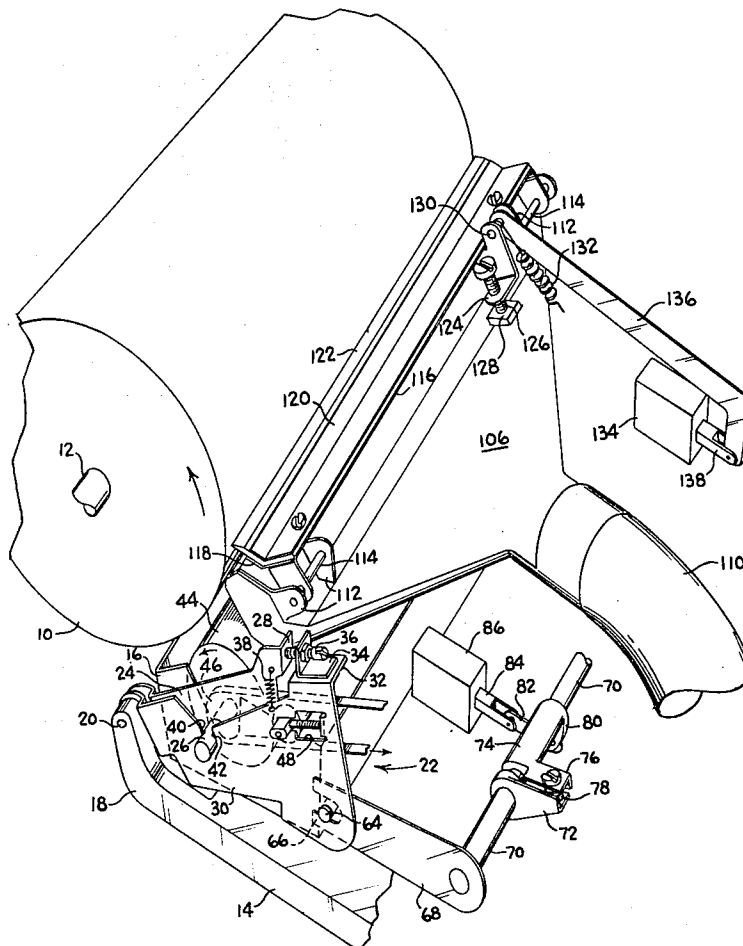
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[57] **ABSTRACT**

A scrub roller which has a solvent absorbing surface is partially immersed in an ink solvent reservoir. Apparatus is provided for automatically lifting the scrub roller into engagement with the blanket roll where it rotates in an opposite direction thereto to scrub the inked surface. Thereafter, it is withdrawn and a wiper blade is automatically advanced against the surface of the blanket roll. A vacuum header adjacent the wiper blade removes the used solvent to waste.

11 Claims, 4 Drawing Figures



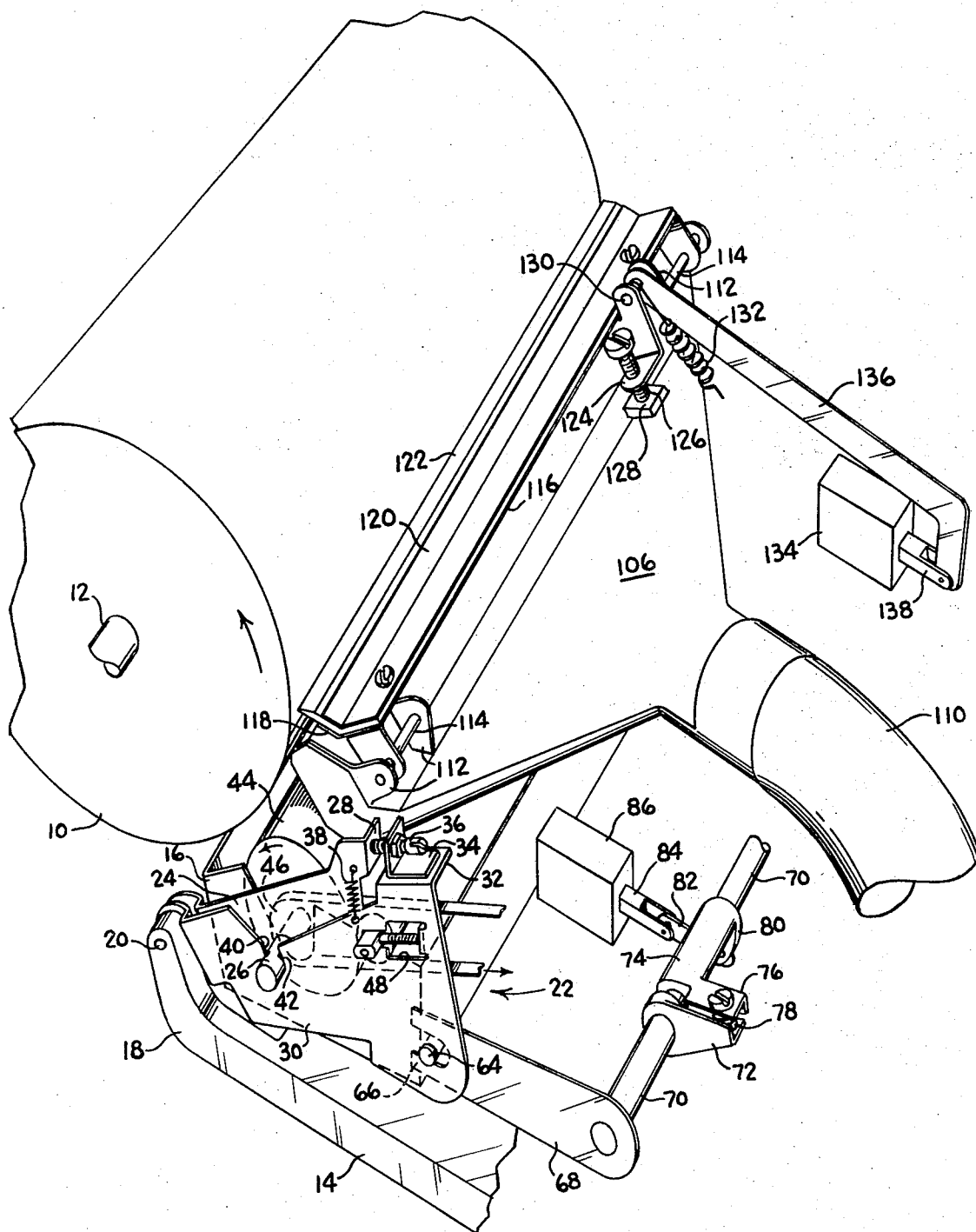


FIG. 1

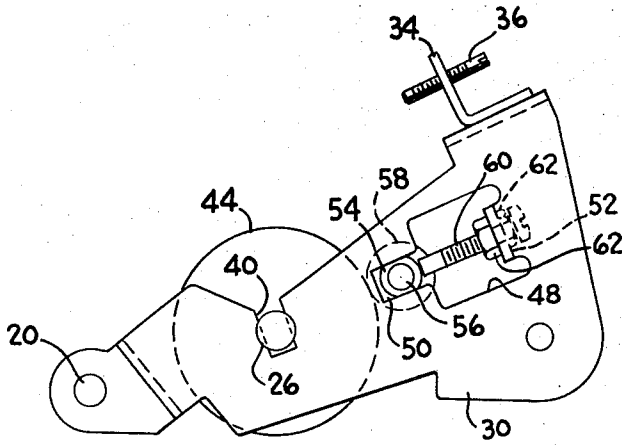


FIG. 2

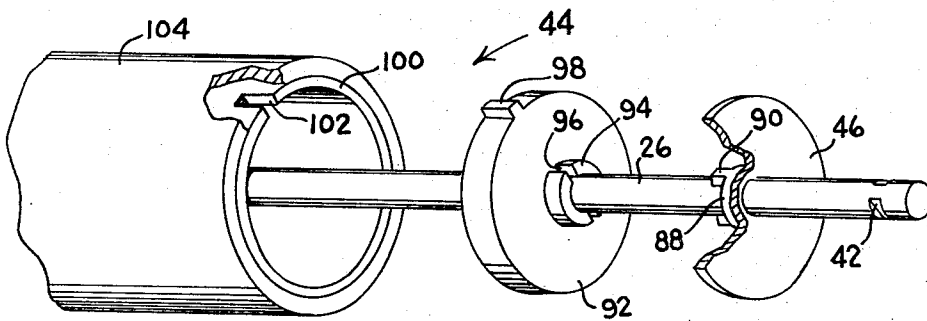


FIG. 3

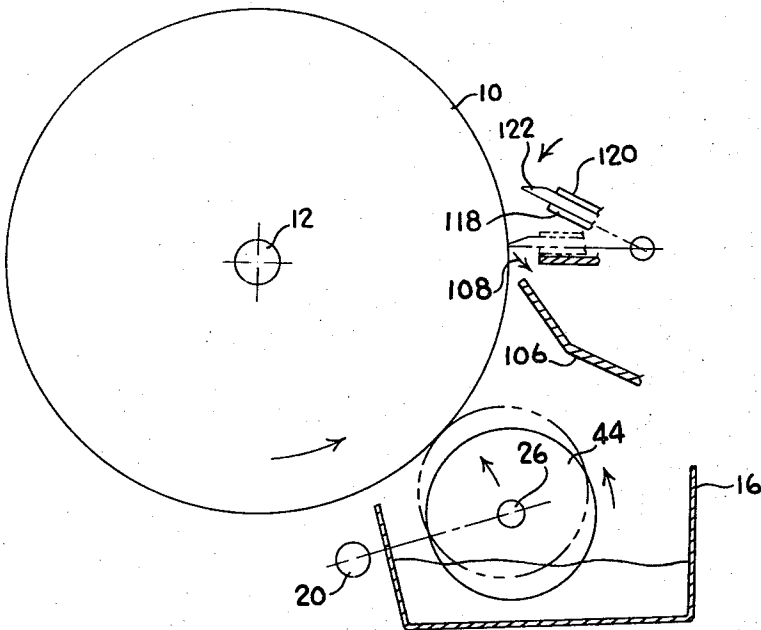


FIG. 4

APPARATUS FOR AUTOMATICALLY CLEANING THE BLANKET CYLINDER OF AN OFFSET PRINTER

BACKGROUND OF THE INVENTION

In offset printing an inked master is applied to the surface of a master cylinder. The inked image is transferred by rolling contact to an offset, or "blanket", cylinder whose surface comprises a relatively thin, flexible ink image is then transferred to a work sheet which is passed between the blanket cylinder and an impression cylinder. When the desired number of imprints have been made from one master, it is removed from the master cylinder, a new master substituted therefor, and another set of imprints made. However, before imprints can be made from the second master, the offset or blanket surface of the duplicating machine must be cleaned to remove any traces of ink which were applied thereto by the previous printing plate. This is often done manually but is slow and inefficient. It has also been proposed to employ semiautomatic means for performing this chore. One such means is illustrated in U.S. Pat. No. 2,832,290 of Mitchell et al. This patent discloses a cleaning assembly which may be manually advanced against the blanket cylinder. A roller is driven by the blanket cylinder and is, in turn, in contact with a wick which is immersed in solvent. The waste solvent apparently mixes with the clean.

It is an object of the present invention to provide a completely automatic blanket roll cleaner and to provide such a cleaner wherein only fresh, clean solvent is applied to the blanket cylinder and wherein the blanket cylinder is quickly and efficiently cleaned. Another object is to provide such a cleaner which is of modular construction and self-powered permitting it to be repaired, adjusted and tested outside the press. Other objects, features, and advantages will become apparent from the following description and appended claims.

SUMMARY OF THE INVENTION

There is provided apparatus for automatically washing a blanket cylinder of an offset press which comprises an elongated solvent reservoir extending longitudinally of the cylinder. A scrub roller which has a solvent absorbent surface is held partially immersed in the reservoir by supporting means. Means are provided for selectively positioning the supporting means to contact the cylinder with the scrub roller. Other means are provided for rotating the scrub roller. An elongated wiper blade is selectively positionable against the cylinder and a vacuum header is adjacent the wiper blade for removing solvent from the surface of the cylinder.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view illustrating the construction of a blanket cylinder cleaner in accordance with the present invention;

FIG. 2 is a side view of a portion of the roller support of FIG. 1;

FIG. 3 is an exploded view illustrating the construction of the scrub roller portion of the apparatus; and

FIG. 4 is a diagrammatic illustration of the operation of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With particular reference to FIG. 1, there is illustrated the blanket cylinder 10 of a conventional offset printing machine which is rotatable about a shaft 12. It is illustrated in conjunction with the automatic blanket cylinder cleaner of this invention. It is to be understood that the apparatus of this invention extends substantially the full length of the blanket cylinder and that most of the supports and adjustments hereinafter described are duplicated at the other end. However, in order to simplify the explanation, reference will primarily be had to that end of the apparatus disclosed in FIG. 1.

A base casting 14 supports an elongated solvent reservoir 16 which is adjacent and parallel to the blanket cylinder 10. At each end of the blanket cylinder, the casting 14 includes an upwardly curved support arm 18 which carries a stub shaft 20. Pivotaly mounted on the stub shaft 20 is a support frame assembly 22. Assembly 22 comprises an inner frame 24 which defines a circular opening carrying one end of a scrub roller shaft 26. It also includes an inwardly directed tab 28.

The other major portion of frame assembly 22 is outer frame 30. The outer frame 30 also carries an inwardly bent tab 32 upon which is mounted an L-shaped bracket 34 which carries an adjusting screw 36 positioned to bear against the tab 28 of inner frame 24. The inner and outer frames are united as a single assembly by means of a tension spring 38. The outer frame 30 defines a substantially rectangular slot 40, the two sides of which engage corresponding slots 42 in the shaft 26. It will thus be seen that the shaft 26 is non-rotatable with respect to the support frame assembly 22. However, relative rotation between the inner frame 24 and the outer frame 30 will permit the shaft to be raised or lowered within the slot 40. The opposite end of the shaft 26 is similarly supported at the opposite end of the blanket cylinder 10. However, the means for preventing shaft rotation, such as slot 42, is adequate if provided only at one end of the shaft. Rotatably mounted upon the shaft 26 and within the reservoir 16 is a scrub roller 44 connected to pulley 46.

The outer frame 30 also defines a relatively rectangular opening 48 which narrows to a guideway 50 as will be best seen by reference to FIG. 2. At the opposite end of the opening 48 from the guideway 50 is an inwardly projecting tab 52. Slidably supported within the guideway 50 is a bearing 54 which may be of plastic or other suitable material. Bearing 54 has straight sides slideably engaging the sides of guideway 50. The bearing 54, and its counterpart at the other end of the apparatus, support therein the ends of a shaft 56 which carries a squeegee roller 58 adjacent the surface of scrub roller 44. An adjusting screw 60 extends through the tab 52 against bearing 54 and is locked in place by lock nuts 62.

Referring back now to FIG. 1, it will be noted that at the end of the outer frame 30 farthest from stub shaft 20 is a stud 64 which is engaged by the forked end 66 of an actuating lever 68. The actuating lever 68, as is its counterpart at the opposite side of the apparatus, is fixedly secured to the end of a control shaft 70. Also fixedly secured to control shaft 70 and rotatable therewith is a crank arm 72. It will be understood that the control shaft 70 is mounted for rotation in bearings

which are omitted herefrom in order to simplify the disclosure. Rotably mounted on shaft 70 is a spool 74 which has at one end an arm 76 parallel to but spaced from the crank arm 72. These arms are interconnected by means of a compression spring 78 which is secured therebetween. At the other end of spool 74 is a crank 80 which is connected through a link 82 to the plunger 84 of a solenoid 86.

The construction of the scrub roller 44 may be best understood by reference to FIG. 3. As previously explained, both the scrub roller 44 and the pulley 46 are rotatable relative to the fixed shaft 26. The pulley 46 (which could also be a sprocket) is provided with a hub 88 having inwardly extending keys 90. A roller end disc 92 also includes a hub 94 with radially extending keyways 96. The outer edge of the end disc 92 carries a key 98. The main body of the scrub roller 44 comprises a relatively rigid plastic cylinder 100 defining a keyway 102 and is covered by a foam rubber surface 104. It will now be seen that assembly of the scrub roller may be quickly achieved by insertion of key 90 into keyway 96 and key 98 into keyway 102. The roller is easily removed and disassembled for cleaning or replacement of the foam rubber surface.

Returning now to FIG. 1, it will be noted that a solvent removal header 106 is mounted above the foam roller and defines an elongated opening 108 (FIG. 4) closely adjacent the surface of the blanket cylinder 10. The header 106 is necked down for connection to a vacuum tube 110 which is connected to a suitable source of vacuum. The vacuum header 106 may be formed of plastic or other suitable material and carries on its upper surface suitable support brackets 112 for carrying pivot shafts 114. A U-shaped mounting bracket 116 is pivotally mounted on the pivot shafts 114 and supports an assembly comprising a lower jaw 118 and an upper jaw 120, between which is mounted an elongated resilient wiper blade 122. Also secured to the lower jaw 118 is an adjustment bracket 124 which carries an adjusting screw 126 which is aligned with a stop 128 formed on header 106. Bracket 124 also carries a stub shaft 130 which is connected by a spring 132 to the body of solenoid 134 and by means of a link 136 to the plunger 138 of the solenoid.

OPERATION

After the printing of the desired number of copies from a given master, the blanket cylinder 10 continues to rotate — as, for example, in the counterclockwise direction illustrated by the arrow in FIG. 1. Rotation of the foam covered scrub roller 44 now begins from a suitable motor and control switch through the pulley 46. This motor may be actuated either by an automatic sequencer or manually. In any event, the scrub roller 44 is also rotated counterclockwise as viewed in FIG. 1 so that its surface and that of the blanket roller 10 are moving in opposite peripheral directions. The bottom portion of the scrub roller 44 is immersed in the ink solvent contained in reservoir 16 and during rotation it is being squeezed by the squeegee roller 58 (FIG. 2) to remove excess solvent therefrom. Solvent is pumped continuously into reservoir 16 and flows over a dam which maintains a constant fluid height. This also serves to flush and clean out the reservoir and provide fresh solution.

Solenoid 86 is next activated to retract crank 80 and rotate the spool 74 clockwise, as viewed in FIG. 1,

about the control shaft 70. This tends to compress the spring 78 which thereupon advances the crank arm 72 and rotates shaft 70. The resilient coupling thus formed permits the solenoid 86 to bottom without exerting excessive force on the remainder of the mechanism. The clockwise rotation of control shaft 70 lifts the levers 68 vertically, thereby lifting the studs 64 and rotating the support frame assemblies 22 counterclockwise about their stub shaft pivots 20. This raises the scrub roller 44 into engagement with the blanket roller 10 where it continues to rotate and to scrub the surface of the blanket roller 10 with solvent. Due to the location of pivot 20 (as seen in FIG. 4), the belt (or chain) tension assists the scrub roller 44 in rising into contact with the blanket cylinder 10. Furthermore, the drag exerted by the blanket cylinder on the foam scrub roller 44 increases the tension in the belt, forcing the roller in better contact with the cylinder and providing better scrubbing action. After a suitable period, solenoid 86 is deenergized and scrub roller 44 returns to its original position.

Thereafter, the solenoid 134 is activated. Retraction of its plunger 138 advances the link 136 to the left and rotates the wiper blade 122 counterclockwise against the force of spring 132 and into engagement with the surface of blanket cylinder 10 as is shown in FIG. 4. The wiper removes ink laden solvent from the surface of the blanket cylinder and this solvent is sucked into the opening 108 of header 106 and then to waste through vacuum tube 110.

Several adjustments may be made between the respective parts of the apparatus of the invention. For example, adjustment of the pressure between scrub roller 44 and blanket cylinder 10 is a result of the use of two frames to form the support frame assembly 22. Adjustment of adjusting screw 36 causes the inner frame 24 to be rotated relative to outer frame 30. The shaft 26 is captured within the inner frame but is movable with respect to the outer frame. This permits an adjustment of its position relative to the blanket roller. Screws 36 are also used for aligning scrub roller 44 to cylinder 10 to assure uniform contact. They may also be used together to increase or decrease scrubbing pressure. The screw through spring 78 may also be used for this purpose. By adjusting this screw, crank arm 72 is urged closer to, or away from, arm 76 which affects the height to which roll 44 will rise when solenoid 86 is actuated.

Another adjustment is provided by the slidable bearing 54 which supports the shaft 56 of the squeegee roller 58. Adjustment of the adjusting screw 60 allows suitable compression to be established between the squeegee roller and the scrub roller 44.

It is believed that the many advantages of this invention will now be apparent to those skilled in the art. It will also be apparent that a number of variations and modifications may be made therein without departing from its spirit and scope. Accordingly, the foregoing description is to be construed as illustrative only, rather than limiting. This invention is limited only by the scope of the following claims.

We claim:

1. Apparatus for automatically washing ink from a rotating blanket cylinder of an offset press which comprises: an elongated reservoir for ink solvent; said reservoir extending longitudinally of said cylinder; a rotatable scrub roller having a solvent absorbent surface;

means for rotating said scrub roller; means for supporting said rotating scrub roller partially immersed in solvent in said reservoir; controlling means for selectively positioning said scrub roller supporting means so as to dispose said rotating scrub roller in and out of contact with said cylinder for selectively applying solvent to said rotating cylinder; an elongated wiper blade extending parallel to the surface of said cylinder; controlling means for selectively positioning said wiper blade in and out of engagement with said rotating cylinder; said controlling means operable in timed relationship with one another for respectively contacting said cylinder with said scrub roller and engaging said cylinder with said wiper blade; and vacuum header means adjacent said engaged wiper blade and cooperative therewith for removing ink laden solvent from the surface of said rotating cylinder.

2. The apparatus of claim 1 wherein said scrub roller supporting means comprises: a non-rotatable shaft on which the scrub roller is rotatably mounted; a pair of spaced support frame assemblies respectively supporting the opposite ends of said shaft; and said frame assemblies pivoted for rotation about a common axis for moving the shaft and thus said scrub roller toward and away from said blanket cylinder.

3. The apparatus of claim 2 wherein said support frame assemblies respectively include first and second substantially planar frames, at least one of said first frames adapted to capture said scrub roller shaft against rotation, said first frame of each frame assembly being movable relative to said second frame thereof; and means for adjusting the position of said first frame of each frame assembly relative to said second frame thereof for adjusting the pressure between the engaged scrub roller and blanket cylinder.

4. The apparatus of claim 1 wherein said scrub roller supporting means includes spaced scrub roller support frame assemblies pivoted for moving said scrub roller toward and away from said blanket cylinder, and said selective positioning means comprises: a rotatable control shaft extending substantially parallel to said scrub roller; a pair of spaced lever means secured to said control shaft, each of said lever means being disposed in engagement with a different one of said support frame assemblies for pivoting said assemblies in response to rotation of the control shaft; a crank arm secured to said control shaft; spool means rotatably mounted on said control shaft and having first and second radial arms extending therefrom; resilient means interconnecting said first arm and said crank arm; and means for selectively rotating said spool means about said control shaft so as to rotate said first arm and thus said interconnected crank arm for rotating said control shaft.

5. The apparatus of claim 4 wherein said means for rotating said spool means comprises a solenoid connected by means of a link to said second radial arm for selective rotation of said radial arm and thus said spool means.

6. The apparatus of claim 1 wherein said scrub roller comprises: rotatably driven pulley means; a roller end disc keyed to said pulley means for rotation therewith; a cylindrical body member keyed to said end disc for rotation therewith; and an ink solvent absorbent sur-

face covering said body member.

7. The apparatus of claim 1 wherein said scrub roller supporting means includes spaced scrub roller support frame assemblies pivoted for moving said scrub roller toward and away from said blanket cylinder, and each of said support frame assemblies comprises: a guideway extending substantially radial to said scrub roller; a squeegee roller bearing movably mounted in said guideway; and means for adjustably positioning said bearing in said guideway.

8. The apparatus of claim 7 comprising a squeegee roller disposed in contact with said scrub roller and supported by said squeegee roller support bearings; and said bearing adjusting means of each support frame assembly includes adjusting screw means for moving said bearing so as to adjust the contact pressure between said squeegee roller and scrub roller.

9. The apparatus of claim 1 wherein said wiper blade positioning means comprises: a U-shaped bracket having an elongated base and spaced parallel arms; said bracket pivotally mounted on said vacuum header means for rotation about an axis extending through said parallel arms; wiper blade clamping means on the base of said bracket for retaining said wiper blade parallel to the surface of said blanket cylinder; and means for selectively pivoting said bracket about its pivot axis from a first position wherein said wiper blade is withdrawn from contact with said blanket cylinder to a second position wherein said wiper blade is disposed in contact with said cylinder.

10. The apparatus of claim 9 wherein said selective pivoting means comprises: a solenoid having a plunger; and link means interconnecting the solenoid plunger and said bracket.

11. Apparatus for automatically washing a blanket cylinder of an offset press which comprises: an elongated solvent reservoir extending longitudinally of said cylinder; a pair of spaced support frame assemblies positioned adjacent the respective ends of said cylinder and pivoted for rotation about a common axis parallel to that of said cylinder; a non-rotatable shaft supported at its ends by said support frame assemblies; a scrub roller rotatably mounted on said non-rotatable shaft and having a solvent absorbing surface partially immersed in said reservoir; means for rotating said scrub roller on said non-rotatable shaft; a control shaft substantially parallel to said scrub roller; a pair of lever means secured to said control shaft, each in lifting engagement with a different one of said support frame assemblies; a crank arm secured to said control shaft; spool means rotatably mounted on said control shaft and having first and second radial arms extending therefrom; resilient means interconnecting said first arm and said crank arm; means for selectively rotating said spool means through an arc about said control shaft to pivot said support frame assemblies and advance said scrub roller into engagement with said blanket cylinder; an elongated wiper blade; means for selectively advancing said wiper blade from a first position withdrawn from said blanket cylinder to a second position in contact with said cylinder; and vacuum header means adjacent said wiper blade for removing solvent from the surface of said cylinder.

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