

[54] **CLEANING UNIT FOR PRINTING PRESS BLANKET**

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 [22] Filed: **July 27, 1971**
 [21] Appl. No.: **166,376**

[52] U.S. Cl. **101/425, 15/256.52, 101/155**
 [51] Int. Cl. **B41f 35/06, B41l 41/00**
 [58] Field of Search..... **101/423, 424, 425, 155, 157, 101/167, 169; 15/256.51, 256.52, 256.53**

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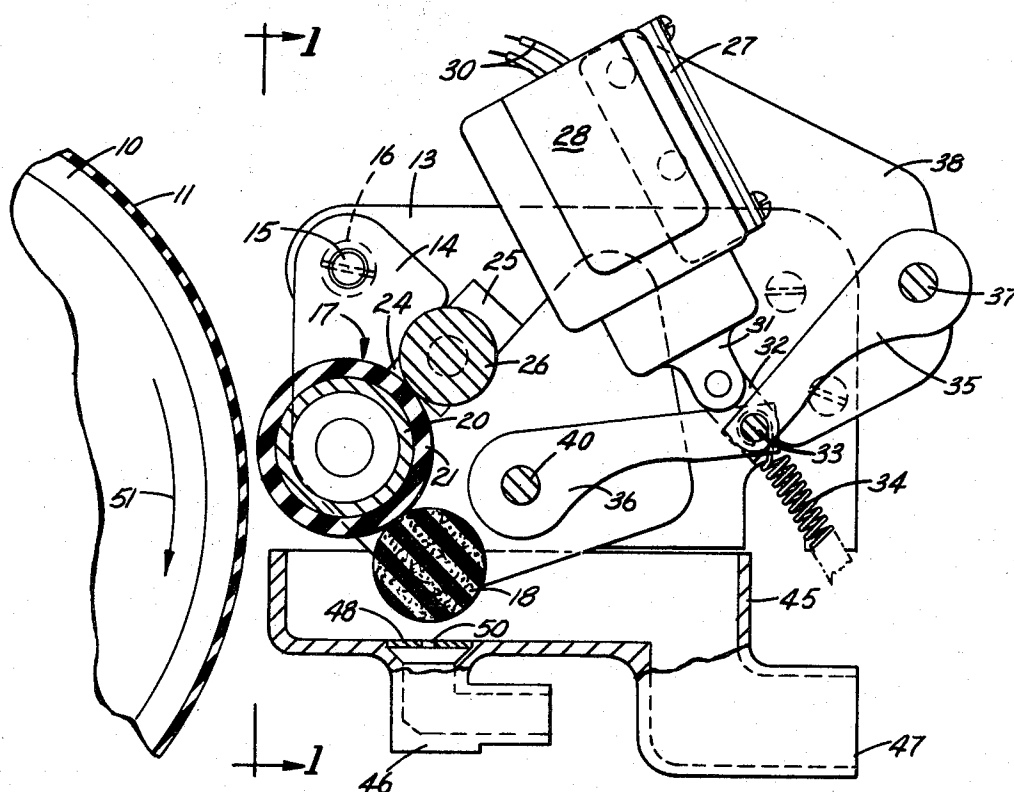
Primary Examiner—Clyde I. Coughenour
Attorney—Russell L. Root et al.

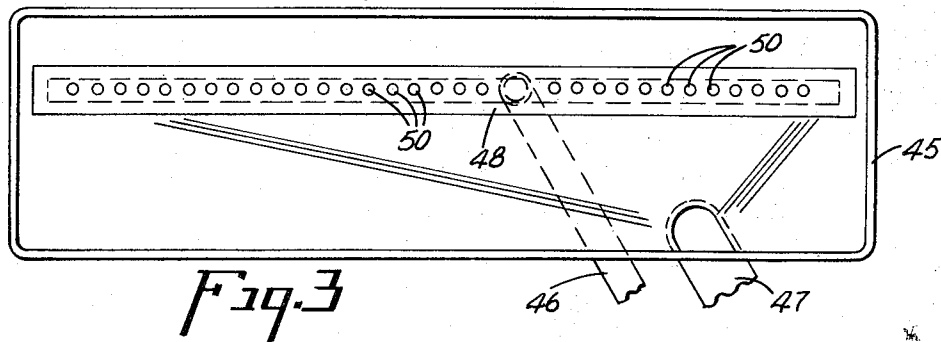
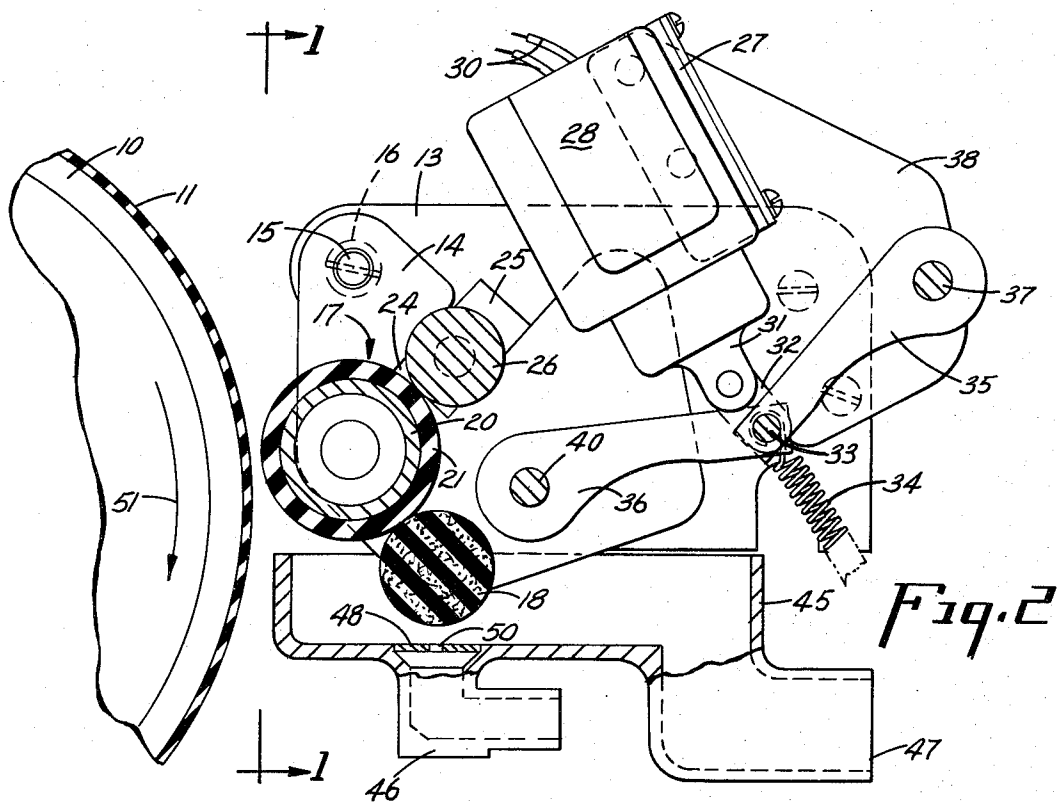
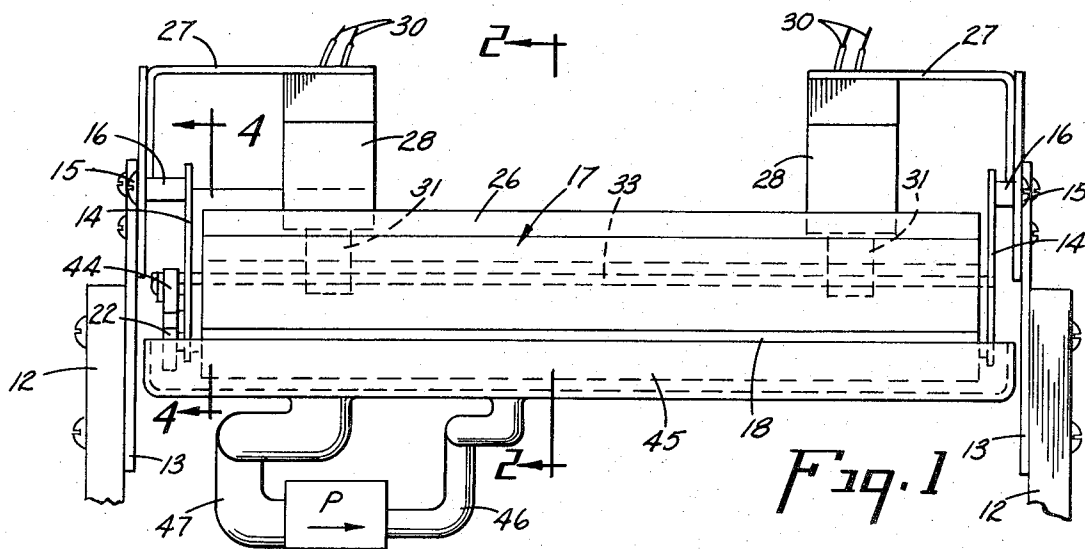
[57] **ABSTRACT**

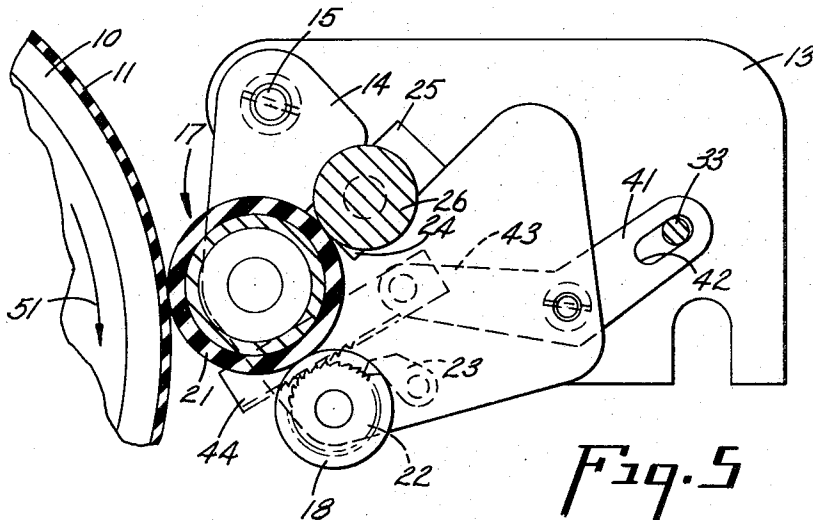
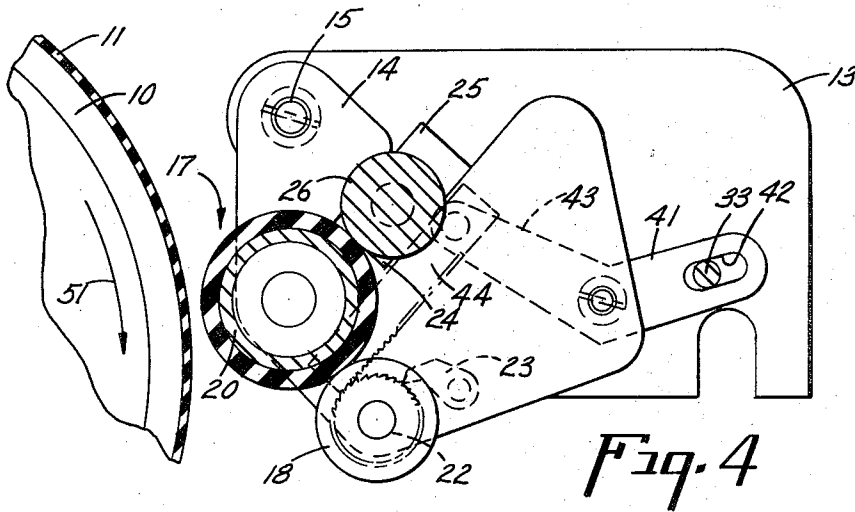
A cleaning unit is provided for removing ink, sludge and like matter from the blanket of a printing press or machine. In one form, the unit comprises a cleaner roll mounted for rotation and adapted to contact and be driven by the blanket during its travel. A wick roll is mounted substantially parallel to and in wiping contact with the cleaner roll, the two rolls being adapted as a unit to be moved toward and away from the blanket to place the cleaner roll in and out of contact with the blanket. However, the wick roll is periodically repositioned with respect to the cleaner roll while that roll is out of contact with the blanket in order to present another wiping portion of the wick roll to contact the cleaner roll.

In this manner, the cleaner roll picks up the ink, sludge and other like matter from the blanket and transfers it to the wick roll. Optionally, as the wick roll continues to be periodically repositioned, the matter collected on the wick roll is removed by a plurality of jets of a cleaning fluid directed against a side of the wick roll that is disposed away from the cleaning roll.

2 Claims, 5 Drawing Figures







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CLEANING UNIT FOR PRINTING PRESS BLANKET

BACKGROUND OF THE INVENTION

Rotary offset printing presses or duplicating machines conventionally contain blanket cylinders covered with a rubber blanket. The blanket receives an image from a planographic master and reproduces it on paper sheets fed through the press. It is necessary periodically to clean the blanket to remove ink as well as to prevent an accumulation of sludge and like matter which otherwise would be transferred to the paper sheets.

The blanket can be cleaned manually. But this requires stopping the printing machine, while cylinders are manually wiped as with a cloth that had been moistened with a cleaning fluid. Moreover, this method is excessively slow, since only an accessible portion of a cylinder or blanket can be cleaned at any one time. The cylinder must be periodically rotated to expose a successively, accessive area until the entire blanket or cylinder has been cleaned.

Various mechanical devices have been proposed to clean a rubber blanket or the like. One device uses an elongated web of absorbent material which is held against the surface of a printing cylinder by rolls or brushes. The printing cylinder is then rotated, resulting in a wiping action between the web and cylinder to remove excess ink. In another structure, a roll is used to supply a cylinder with liquid solvent which is thereafter removed together with ink softened by the solvent with scraper blades or the like.

United States Reissue Pat. No. 24,739 to Janke et al. discloses a device for cleaning the offset or transfer surfaces of printing machines in which an absorbent, liquid-transferring material extends between a receptacle and a cleaning roll and serves to supply cleaning solvent to the roll from the receptacle. While this device operates quite effectively, it lacks the advantages of this invention.

United States Pat. No. 3,422,758 to Brewster describes an improved blanket cleaner derived from that described by the cited Janke et al. reissue patent. In this case, a wick also supplies a cleaning solvent from a reservoir to a cleaning roll which is adapted to contact and clean a blanket of a printing press. This wick is of improved configuration defining a short, direct, broad conducting path extending vertically between the body of a cleaning solvent and the cleaning roll. The wick comprises a special type of polyurethane sponge releasably held in place, for use or ready replacement, by a removable cover on the reservoir. The cover also retains the wick against the tendency of the cleaning roll to dislodge it.

Although this wick results in improved operation, the upper contact surface of the wick tends in time to become coated with a sludge insoluble in the cleaning solvent. As a result, the effect of the scrub of the wick is reduced. The sludge so formed is a combination of moisture, paper lint, ink and salts from the etch and fountain solutions. When the sludge build-up becomes sufficiently heavy, it is necessary for an operator to disassemble the blanket cleaner and either clean the wick or replace it.

It would, therefore, further advance the art to provide a blanket cleaner that had great utility by reducing

maintenance and enabling longer running time for a press before ink accumulations and the like required a shut-down.

SUMMARY OF THE INVENTION

In the present cleaning unit, a wick member remains stationary with respect to a cleaning roll at least while the roll is in rotating engagement with a blanket to clean it. In addition, the wick member is periodically repositioned with respect to the cleaning roll in order to present repeatedly a clean wiping surface to the roll and thereby avoid gradual accumulation of sludge or other contaminants on the wick. A previously used portion of the wick is subsequently cleaned before such portion is again presented to the cleaning roll after a series of successive, repositioning moves of the wick member.

More particularly, in the preferred embodiment, the wick member is in roll form and mounted substantially parallel to and in wiping contact with the cleaner roll. The two rolls are pivoted en masse as a unit with respect to the printing press to move toward and away from the blanket and to place the cleaner roll in and out of contact with the blanket. Although the wick roll is held against turning while the cleaner roll is in contact with the blanket, power means periodically, incrementally rotates the wick roll to present a fresh, clean wiping surface to the cleaning roll. As the wick roll continues to be rotated through partial arcs, the soiled portions thereof are subjected to the cleansing action of jets of cleaning solvent which flush the contaminants and sludge into a tray or reservoir beneath the wick roll. The flushed and cleaned areas of the wick roll are then ready to contact once again the cleaning roll upon continued step-by-step rotation of the wick roll. The same power means which moves the cleaning roll unit into contact with the blanket can be used as well to reposition the wick roll.

IN THE DRAWINGS

FIG. 1 is a front elevational view of a cleaning unit of the present invention, taken on the plane of the line 1—1 of FIG. 2;

FIG. 2 is a section of FIG. 1 shown on an enlarged scale on the line 2—2;

FIG. 3 is a plan view of a tray or reservoir used in cleaning the wick roll;

FIG. 4 is a section of FIG. 1 on the line 4—4 and illustrates the arrangement of parts of the cleaning unit while out of engagement with a blanket; and

FIG. 5 is a section similar to that of FIG. 4 and shows the arrangement of parts of the cleaning unit when the cleaning roll contacts a blanket.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, the present cleaner unit is shown in combination with a blanket cylinder 10 having a rubber offset blanket 11 secured to its outer surface in a known manner. The cylinder 10 is conventionally mounted for rotation in the frame 12 of a printing machine of the lithographic type, such as a standard office duplicator, and driven from a suitable power source. An inked image is transferred by rolling contact

from a printing plate to the offset blanket 11 of the cylinder 10 and from there to a work sheet in the usual manner. The invention is not otherwise concerned with the particular details of a printing or duplicating machine. As shown in FIG. 2, the cylinder 10 generally is positioned so that the ink transfer surface of the blanket 11 is accessible for cleaning, either from the front or the rear of the machine.

In the illustrated embodiment, the cleaning unit of the present invention comprises a pair of side support plates 13 of generally rectangular shape which are suitably secured to the sides of the frame 10. A swing plate 14 is pivotally connected to each support plate 13 through a bolt 15 and spacing, concentric collar 16. The swing plates 14 support between them a cleaning roll generally shown at 17 and a wick roll 18 both of which are mounted for rotation on the plates 14. The two rolls 17 and 18 are parallel and contact one another as shown in FIG. 2. The cleaning roll 17 comprises a metal core 20 having an elastomeric cover 21 conventionally secured to it. The wick roll 18 preferably comprises a shaft having an outer elastomeric covering which may be composed of the material described in United States Pat. No. 3,422,758 to Brewster for the wick.

The particular form of this material which is presently preferred for use as a wiper is known as "Scottfelt 3-900," made in the United States by Scott Paper Company in Cincinnati, Ohio. This is a polyurethane foam which in a previous expanded form comprised about 90 pores to the lineal inch, and which has been compressed to one third of its original volume. This compression normally applied to a sheet of expanded material in a single direction normal to the surface of the sheet.

At the left hand end of the wick roll as viewed in FIG. 1, there is a ratchet 22 (FIG. 4) fixed to the shaft of that roll. A gravity pawl 23 pivotally mounted on a swing plate 14 continually engages the ratchet by reason of its weight. The teeth of the ratchet and pawl are shaped to permit movement of the ratchet only in a counterclockwise direction as viewed in FIG. 4.

The upper edge portion of each swing plate 14 is slotted as at 24 to receive a bearing 25 in which a metering roll 26 is rotatably mounted in contact with the cleaning roll 17. The force with which the metering roll 26 is held against the surface of the cleaning roll 17 is controlled by the weight of its total assembly as shown in the drawings, and can be varied by means known in the art.

The present unit may contain power means to move the swing plates 14 and the rollers 17, 18 and 26 toward and away from the blanket 11 to make or break cleaning contact between the cleaning roll 17 and the blanket 11. Preferably, this same power means is used to turn the wick roll 18 through a few degrees of rotation.

(See FIG. 1). In the form illustrated, each of a pair of brackets 27, which are supported with respect to the frame 12, carries a solenoid 28 electrically energized by leads 30. A plunger 31 of each solenoid is pivotally joined to a stub link 32 which freely fits about an actuating rod 33 that extends from solenoid to solenoid. Each solenoid 28 is of the type that retracts its plunger 31 inwardly upon being energized. A spring 34 attached at one end to the actuating rod adjacent each

link 32 and its other end to a support (not shown) fixed with respect to the frame 12, returns the plunger outwardly when the solenoids are deenergized.

An over-centering toggle is used to connect the operation of the solenoids to the swing plates 14. As shown in FIG. 2, two toggle levers 35 and 36 have openings at their adjacent ends freely receiving the actuating rod 33. Lever 35 pivots about a pin 37 on a bracket extension 38 which is fixed relatively to the support plate 13. Lever 36 pivots about a pivot pin 40 on a swing plate 14 and is therefore movable therewith. Upon actuation of the solenoids, the rod 33 moves from the position in FIG. 2 wherein the levers are in angular relationship, to a position substantially in straight line relationship with pins 37 and 40. Pin 37 is fixed to plate 38, and therefore, pin 40 must swing the plates 14 about their pivots.

Disposed between a support plate 13 and a swing plate 14 on the left hand end of the unit, as viewed in FIG. 1, there is actuating means responsive to the operation of the solenoids 28 to move the wick roll through a short turn. A bell crank lever 41, pivotally mounted on a swing plate 14 (FIG. 4), has a slotted end 42 which receives the actuating rod 33. The other end 43 of the bell crank lever pivotally connects to a rack 44 which engages the teeth of the ratchet 22 on the wick roll 18. Although the rack 44, ratchet 22, and gravity pawl 23 are installed only at one end of the unit illustrated, two solenoids are employed to move the parts quickly and to avoid an off-center application of thrust.

The unit may optionally contain means to clean the accumulated sludge and contaminants from the wick roll 18. A shallow plastic tray or reservoir 45 is suitably mounted beneath the cleaning and wick rolls and has an entrance conduit 46 and a drain conduit 47 which are serially connected through a pump P to circulate a cleaning solvent. The floor of the tray 45 has a rectangular channel which extends substantially the length of the tray (FIG. 3). A strip 48 covers the channel and has a series of relatively small jet openings 50.

In operation, the blanket cylinder 10 turns in the direction of arrow 51 of FIG. 2. The cleaning unit and specifically the cleaning roll 17 are thrust against the blanket 11. In the illustrated embodiment, this may be accomplished by periodically energizing the solenoids 28, such as by conventional time relays which close electric circuits to energize the solenoids.

When the solenoids are deenergized, the parts are as shown in FIG. 4. Upon being energized, the solenoids retract their plungers 31, and the upward movement of the rod 33 operates the over-centering toggle. Since pivot pin 37 is fixed, the effect is to pivot each swing plate 14 around its pivot bolt 15 in a clockwise direction as viewed in FIG. 2. Before the cleaning roll 17 contacts the blanket 11, the same solenoid operation through the bell crank lever 41 thrusts the rack 44 downwardly to rotate the wick roll 18 through a partial turn by means of engagement of the rack with the ratchet 22.

Thereafter, the cleaning roll 17 strikes the blanket 11, the parts then being arranged as shown in FIG. 5. The rotation of the cylinder 10 drives cleaning roll 17 in a counterclockwise direction as viewed in FIGS. 2, 4 and 5. During this time, cleaning roll picks up ink and

other contaminants from the blanket 11. The rotation of the cleaning roll 17 in a counterclockwise direction urges wick roll 18 to rotate in a clockwise direction as viewed in the figures because of their frictional contact with one another. Pawl 23 prevents this movement by engaging ratchet 22. Instead, wick roll 18 is stationary with respect to cleaning roll 17 and wipes its surface to receive, in turn, the contaminants removed from the blanket 11. When the solenoids 28 are deenergized, the weight of the unit and urge of springs 34 causes the swing plates 14 to pivot back to their original positions, breaking the contact between blanket 11 and cleaning roll 17. Thereafter, the operation is repeated as described, each forward movement of the rolls toward the blanket causing the wick roll 18 to be partially turned by the rack 44 and ratchet 22 to present a clean wiping surface to the cleaning roll.

As the wick roll 18 continues its step by step rotation, the areas soiled by wiping the cleaning roll 17 eventually reach a position directly over the strip 48. Pump P forces a cleaning solvent under pressure through the entrance conduit 46 and out the openings 50 as multiple jets which strike the soiled areas of the wick roll. The force of the jets upon the roll strip away the contaminants and sludge and, when the wick roll 18 is of a porous nature, keeps its pores open.

The solution leaves the tray 45 through the drain 47 to the pump P. The removed sludge remains at the bottom of the tray which preferably is of the throw-away plastic type of container which can be replaced. If desired, the conduit 47 may be equipped with a filter to remove any sludge which escapes the tray 45.

While soiled areas of the wick roll 18 are being cleaned, the wick roll continues its periodic, partial turning until the cleaned areas are again placed in contact with the cleaning roll 17, after which the operation is the same as previously described.

Some of the cleaning solvent sprayed from the jet openings 50 against the wick roll will be carried by that roll to the cleaning roll 17 and then to the blanket 11. Here the cleaning solvent softens ink upon the blanket to facilitate its removal. In this event, the metering roll 26 controls the amount of cleaning fluid remaining on the surface of the roll 17. Roll 26 can be urged against the surface of roll 17 by standard means, not shown, such as a leaf spring. By adjusting the force by which roll 26 presses against cleaning roll 17, the amount of cleaning solvent passed by roll 17 to the blanket 11 can be varied.

The present cleaning unit increases the number of cleaning cycles of a printing machine before maintenance is required. In test runs, the present cleaning unit operated successfully for over 10,000 blanket cleaning cycles before it required cleaning itself.

During this time, the only maintenance required was the addition of cleaning solvent to the system, for example at the rate of about 1 quart per 1,000 masters.

Although the foregoing describes a preferred embodiment of the present invention, it is understood that the invention may be practiced in still other forms within the scope of the following claims.

What is claimed is:

1. In a printing press having an offset blanket cylinder, apparatus to clean a blanket on the cylinder comprising:

a cleaner roll mounted for rotation and adapted to contact the blanket during its travel and rotate, thereby to remove ink, sludge and like matter from the blanket onto the cleaner roll;

a normally stationary wick roll having a portion wiping the cleaner roll during its rotation to receive from said cleaner roll the matter collected from the blanket;

means to restrict movement of the wick roll at least while said cleaner roll engages said blanket;

said cleaner and wick rolls being jointly mounted in substantially parallel contacting relation in movable support means;

power means adapted to move the movable support means toward and away from said blanket to place the cleaner roll in and out of contact with the blanket;

means periodically to reposition the wick roll with respect to the cleaner roll to contact another portion of said wick roll with the cleaner roll responsive to the activation of said power means when said cleaner roll is out of contact with said blanket.

2. The printing press of claim 1 in which said power means comprises an actuating plunger connected to said movable support means and pivotally joined to a pivotally mounted lever;

said lever being pivotally connected to a rack meshing with ratchet means fixed with respect to said wick roll;

whereby actuation of the plunger moves said movable support means as defined and partially turns the wick roll through said rack and ratchet means.

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