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[33] **Austria**
[31] **A655/68**

[54] **WASHING ARRANGEMENT FOR THE BLANKET CYLINDER OF AN OFFSET PRINTING MACHINE**
6 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **101/425**
[51] **Int. Cl.** **B41f 35/06**
[50] **Field of Search** 101/425, 148, 217, 351, 352

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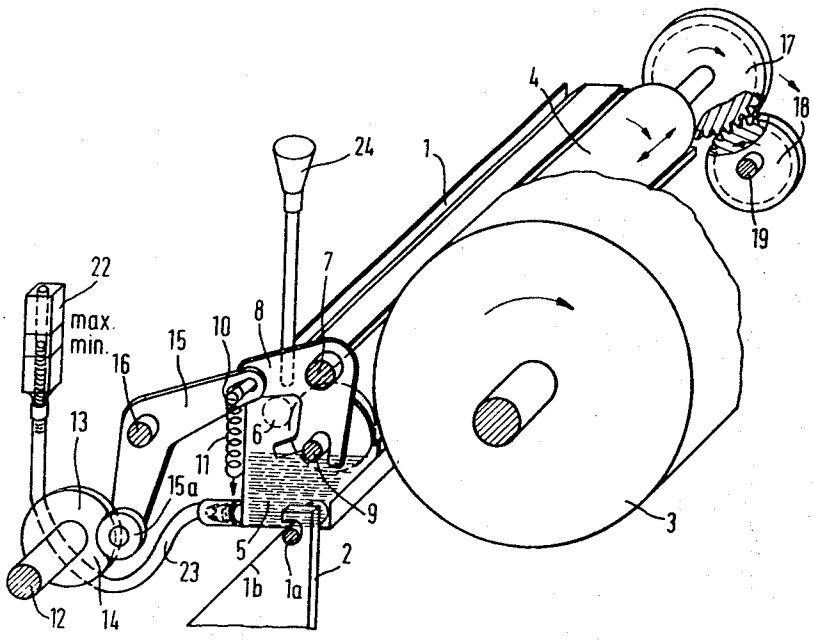
ABSTRACT: The washing roller of an offset printing machine is moved into circumferential engagement with the rotating blanket cylinder of the machine when the latter is to be washed, and a gear on the washing roller is thereby engaged with a gear rotated about a fixed axis on the machine frame for rotating the engaged portions of the roller and of the cylinder in opposite directions while they are also oscillated axially relative to each other and supplied with washing liquid.



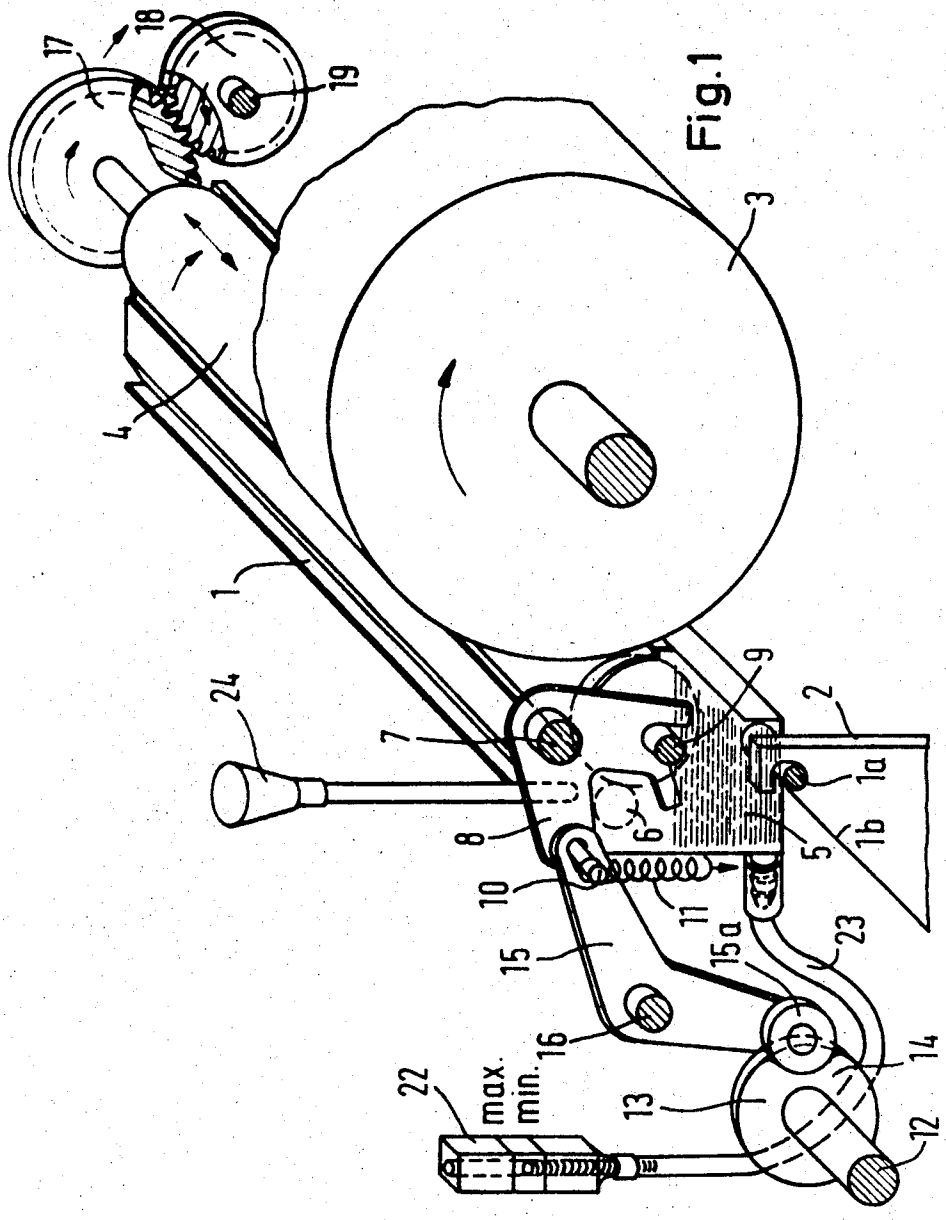


Fig.1

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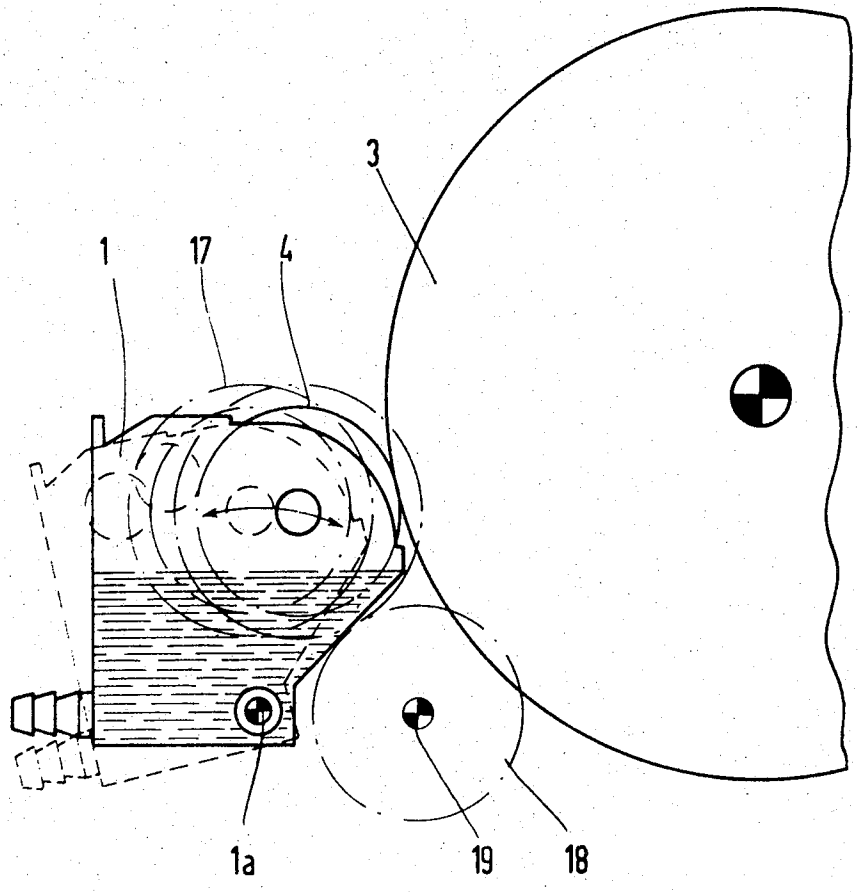
Fig. 2



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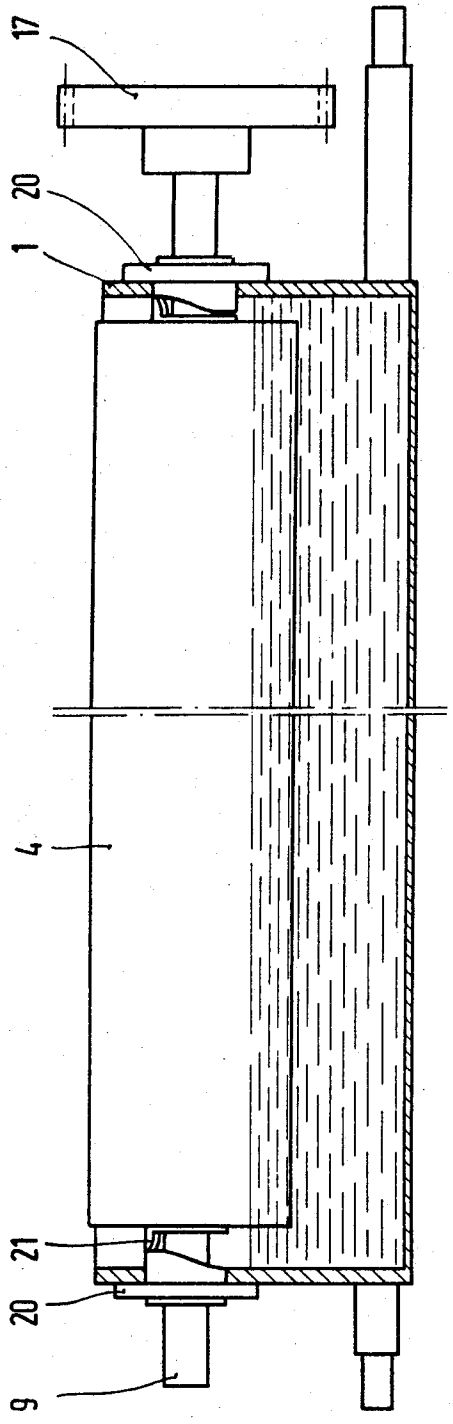

Fig. 3

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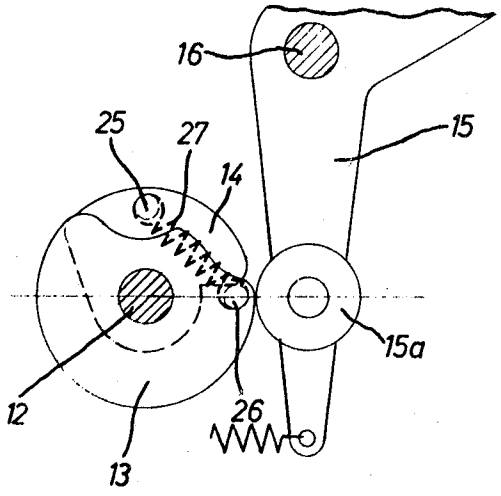

Fig.4a

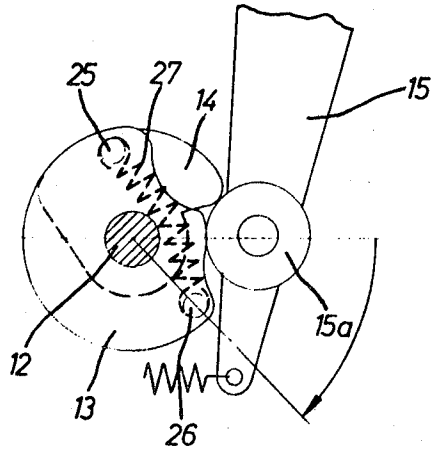

Fig.4b

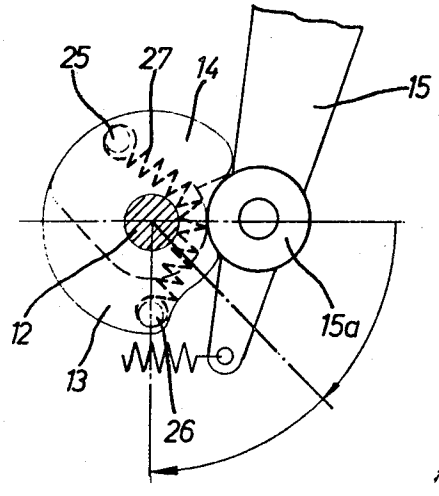

Fig.4c

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WASHING ARRANGEMENT FOR THE BLANKET CYLINDER OF AN OFFSET PRINTING MACHINE

The present invention relates to blanket wash mechanisms for the offset or blanket cylinders of offset printing machines. The invention is more especially concerned with such mechanism for small or office offset printing machines, comprising a washing roller rotating inside a container for washing liquid, pivoting means for pressing the roller against the blanket cylinder, and a drive means for causing rotation of the roller which is provided with means for causing it to oscillate axially.

Blanket washing mechanisms are known mechanisms using oscillating or rollers with absorbent coatings of foam material, felt, or the like. Such rolls have the disadvantage that they transfer a comparatively large amount of liquid to the blanket so that the latter must be dried with the help of a second roll. A further disadvantage of such rolls is that the felt or foam material coating rapidly becomes dirty and therefore must be frequently changed.

There are also blanket washing mechanisms employing oscillating rubber rolls without such absorbent coatings. Since, however, such rolls do not have their own drive means and are only driven by contact with the blanket, and since the only rubbing contact between the roll and the blanket is due to the axial oscillation, there is the disadvantage that a large number of rotations of the blanket are necessary before it comes clean and the amount of time required is excessive.

Finally, a blanket wash mechanism is known using a roll with a coating of foam material which driven by means of an auxiliary motor at a speed lower than that of the blanket. With this construction the foam material coating of the wash roller must be changed, and there is the further disadvantage that too much liquid is placed on the blanket so that the latter must be allowed to dry before printing can be carried out. Furthermore, the additional drive motor increases the weight and size of a small offset printing machine and puts up costs.

One object of the invention is to provide a blanket wash mechanism which is free of the above disadvantages.

A further object of the invention is to provide such a mechanism which can clean the blanket only using a small quantity of liquid so that drying can take place quickly.

A further object of the invention is to provide such a mechanism which does not require special attention and is capable of operating without a layer of absorbent material, such as foam material or felt, on the wash roll.

Finally, a further object of the invention is to provide a blanket wash mechanism which takes up little space and is cheap to manufacture.

The present invention consists in a blanket washing mechanism for an offset printing machine, comprising a washing roll, a container arranged to hold washing liquid so that the roll can dip into the liquid, pivotal means for causing bodily movement of the roll in relation to the blanket cylinder of the offset machine, means for pressing the washing roll against the blanket cylinder, driving means for causing the roll to rotate, means for causing the washing roll to oscillate along its axis, the washing roll being a rubber roll, and the means for driving it being arranged to rotate it in the same direction as the blanket cylinder using a driving force taken from the offset printing machine.

Owing to the rotation of the wash roll in the same direction as the blanket, an optimum washing effect is obtained with a minimum application of washing liquid to the blanket. As a result, washing time can be reduced below the time required by other washing mechanisms. Thus the washing time may be halved.

Preferably a spring is provided to urge the wash roll against the blanket in order to compensate for decrease in the size of the wash roll with wear or other causes.

In accordance with a preferred feature of the invention the driving means comprises two cylindrical gear wheels arranged to be brought out of mesh by movement of the roll away from the blanket cylinder and to be brought into mesh by movement of the roll towards the blanket cylinder, the two cylindrical gears being arranged to urge the roll away from the blanket cylinder in a direction which is substantially radial in relation to the blanket cylinder. Owing to the force urging the wash roll away from the blanket, jamming is avoided since the wash roll is only urged against the blanket by a spring.

Alternatively, however, the drive arrangement can be such as to urge the wash roll radially towards the blanket.

In accordance with a further preferred feature of the invention, the mechanism comprises a lever for pivoting the roll bodily in relation to the blanket cylinder, and means, connected with the roll by means of the lever, for setting the roll in at least two different positions in relation to the blanket cylinder. Additionally the mechanism can include a rotary cam, a cam follower on the lever, first and second steps on the cam at different distances from the axis of rotation of the cam, a pivoting guard which has a follower-engaging face axially aligned with the outermost cam step, the guard being arranged to be held back by the follower when the cam is rotated in one direction so that the guard in consequence then allows the follower to run on to the second step of the cam, While on rotating the cam in the other direction the guard provides an abutment for the follower holding it clear of the second cam step.

In accordance with a further preferred feature there is a third cam step at a smaller radial distance from the cam axis than the first step and also arranged to be prevented by the guard from being engaged by the follower when the cam is turned in one direction of rotation, positions of the roll and the gear wheels determined by engagement of the follower with the three cam steps being as follows: gear wheels out of mesh; gear wheels in mesh and roll clear of blanket cylinder; and roll in contact with blanket cylinder and gear wheels in mesh.

Preferably, also, the container, apart from an opening for the roll, is substantially closed and is arranged to pivot with the roll when the roll is pivoted bodily.

The liquid container can be connected with a flexible tube whose other end is provided with a transparent liquid viewing means for checking the level of liquid in the container, the tube being detachably mounted so that it can be lowered and used for emptying the container.

Further details of the invention will be found in the accompanying drawings of a specific embodiment of the invention.

FIG. 1 is a perspective view of a rubber blanket washing mechanism in accordance with the invention.

FIG. 2 is a fragmentary side view of the arrangement shown in FIG. 1.

FIG. 3 shows the blanket washing mechanism of FIG. 1 in fragmentary front elevational section.

FIG. 4*a*, 4*b* and 4*c* are diagrammatic views of a control for the device of the invention.

As shown in FIG. 1, reference numeral 1 denotes a liquid container with pins or trunnions. One such trunnion 1*a* at one end of the container 1 is mounted in a fixed bracket. 2. The other trunnion at the other end of the container is also mounted in a similar bracket. The axis defined by the trunnions represents the axis of tilt for the container 1 towards and away from the blanket cylinder 3 of the small offset machine to which the mechanism is fitted. The trunnions can be withdrawn from slots in the tops of the brackets 2 and slid down the oblique faces 1*b* of the brackets for removal of the container. A washing roller 4 carries a coating of rubber and dips down into washing liquid 5 contained in the container 1. The amount of liquid clinging to the surface of the roll 4 and reaching the blanket cylinder 3 is regulated by means of a clearing roller 6 whose position can be adjusted.

Two swinging levers or hangers 8, which are fixed to a diagrammatically shown shaft 7 journaled in the frame, have downwardly extending forklike arms into which the ends of the drive shaft 9 of the wash roll 4 are inserted. The two levers 8 at the ends of the container are generally similar. The prongs of the forks remote from the blanket cylinder 3 are bent away from the cylinder so as to allow the liquid container 1 and the roll 4 to be removed easily when they have been swung away

from the blanket cylinder, against the resistance of a tension spring 11. The lever 8 as shown in the drawing has a further lever arm extending away from the blanket cylinder 3 and carrying a pin 10. The top end of the spring 11 is attached to this pin while its bottom end is attached to part of the offset printing machine which is not shown. During blanket washing the spring 11 presses the washing roll 4 against the blanket cylinder 3.

The swinging of the wash roll towards and away from the blanket cylinder 3 is arranged to be carried out by means of a control lever forming part of the small offset machine. Such control levers are commonly fitted to such machines and a movement in a forward direction brings the cylinder carrying the plate into contact with the blanket cylinder for inking and then simultaneously starts the paper feed mechanism and reduces the gap between the blanket and impression cylinders so that printing can proceed. On the return or backward movement of the control lever operations are reversed. In the arrangement shown in FIG. 1, the control lever is arranged to rotate the control shaft 12 on which a circular disc cam 13 is fixed. A recess is provided in the cam 13 to operate one arm of a pivoting lever 15 which is mounted on a bolt 16 and whose other arm has a slot which is fitted over the pin 10 mounted on lever 8. The cam 13 which will be described in detail below, serves as an abutment in order to prevent the blanket wash roll tilting backwards.

As can also be seen from FIG. 1, the quid container is provided with a flexible tube 23 whose left-hand end is provided with a transparent level viewing device 22. The device 22 is attached to any suitable plate of the housing of the printing machine. If the level in the liquid container falls too low, it can be replenished via a fixed filling tube 24. For removing liquid from the container, the viewing means 22 can be removed from its mounting and lowered so that the liquid runs out through the tube 23.

On referring to FIGS. 1 and 2, it will be seen that the drive of the wash roll 4 is taken from a drive shaft 19 on which there is fixed a cylindrical gear wheel 18. This cylindrical gear wheel comes into mesh with cylindrical gear wheel 17 fixed on the shaft 9 of the wash roll as the liquid container 1 and the wash roll 4 are swung about the axis of the trunnions 1*a* for blanket washing. The wash roll 4 and blanket cylinder 3 rotate about their respective axes in the same direction so that the frictionally engaged surfaces of the wash roll 4 and of the blanket cylinder 3 move in opposite circumferential directions. This leads to maximum efficacy of washing. In order to prevent a jamming of the roll and the cylinder together as they rotate in the same direction, the position of the drive gear wheels 17 and 18 is so chosen that there is no additional pressure on the rubber blanket cylinder 3 from wash roll 4 due to torque transmission.

As can be seen from FIG. 3, the drive shaft 9 carrying the wash roll 4 and the gear wheel 17 is provided with bushes 20 mounted in the sidewalls of the liquid container 1. The bushes 20, which are fixed in openings in the walls so as not to be able to rotate, have camlike projections which cooperate with corresponding camlike projections on the core 21 of the roll 4. Since, the roll 4 and its core 21 can be slid along its drive shaft 9 but it is keyed so as not to be able to rotate in relation to the shaft, the axial projections on the bushes and the wash roll core 21 are caused to oscillate axially so that streaks of ink on the blanket cylinder 3 are avoided.

The following describes the manner of function of the blanket wash mechanism, reference being made more especially to FIGS. 4*a* to 4*c*.

As can be seen from FIG. 4*a* the control unit for causing pivotal movement of the blanket wash roll 4 and the container 1 comprises the above-mentioned disc cam 13 and a pivoting segment-shaped guard 14. The disc cam 13 can be regarded as having three steps for cooperation with a cam follower roller 15*a* on the lever 15, that is to say a part-circular step or face extending through about 220°, and steps defined by the bottoms of recesses in that face which communicate with each other. The cam 13 is carried on the bush which is clamped to the shaft 12. The guard 14 is pivoted on the bush. In its rest position, it substantially completely overlaps the two recesses as viewed in an axial direction. As a result, again when viewed in an axial direction, the cam 13 and the guard 14 form a substantially complete circle. Pins 25 and 26 on the guard 14 and the cam 13 respectively serve for anchoring the ends of a tension spring 27 which urges the guard 14 into the position shown in FIG. 4*a* so as to cooperate with the outer part-circular face of the cam 13 in forming a complete circle. The guard 14 can only be pivoted in relation to the cam 13 in a counterclockwise direction so as to tension the spring 27. The guard 14 can pivot relative to the cam 13 only when the cam and the guard are rotated clockwise so that the guard 14 is held back by the roller 15*a* on the lever 15. In order to enable the roller follower 15*a* to engage the guard 14, the guard and the cam do not completely overlap in an axial view, as is shown in FIG. 4*a*. The size of this gap or lack of overlap can be set by turning the pin 26 which has an eccentric face against which the guard 14 abuts.

As shown in FIG. 4*b*, when the cam 13 has rotated 45° out of the position shown in FIG. 4*a*, the guard 14 is still held back by the roller 15*a* and the latter passes into the first recess in the cam 13 so that the wash roll 4 moves from a rest position (corresponding to the roller 15*a* riding on the outer face of cam 13) to an idling position in which the gear wheels 17 and 18 mesh so that the wash roll 4 rotates and is covered with washing liquid. When the wash roll 4 thereafter passes into the working position, in which the actual washing takes place, it is already covered with wash liquid.

FIG. 4*c* shows the cam 13 after a further rotation through 45°. Guard 14 has been pushed further back so as to uncover the second recess. The wash roll is now swung into the working or wash position by the spring 11, making contact with the rubber blanket cylinder so that washing takes place.

On further rotation of the cam 13 the wash roll 4 is swung back, the guard being drawn by the tension spring 27 into its initial position in relation to the cam 13. The rubber blanket washing mechanism is thus brought back into its rest position.

When the control lever of the printing machine is set for starting the printing operation, the cam 13 is moved counterclockwise, the roller 15*a* is incapable of holding back the guard 14 to uncover the recesses in the cam so that the roller 15*a* cannot slip into the recesses of the cam 13.

The rubber blanket wash mechanism in accordance with the invention is thus so designed that an automatic switching on of the wash roll 4 occurs as the operating or control handle of the small office machine is moved out of the printing position. Ink is removed from the blanket cylinder and cannot dry on it, so that the rubber blanket is kept in good condition.

What we claim is:

1. In an offset printing machine including a blanket cylinder having an axis; means for rotating said cylinder about said axis in a predetermined direction during operation of said machine; a washing roller having an axis substantially parallel to the axis of said cylinder; a frame supporting said cylinder and said roller; moving means for moving said roller toward and away from a position in which respective circumferential portions of said cylinder and of said roller are engaged in contact with each other; liquid supply means for applying a washing liquid to the circumference of said roller; the improvement which comprises:

a. drive means for rotating said roller about said axis thereof in said predetermined direction, whereby said engaged circumferential portions move in opposite directions; and

b. oscillating means responsive to the rotating of said roller by said drive means for oscillating said roller in the direction of said axis thereof, said drive means including

1. a first gear member secured to said roller for joint rotation,

2. a second gear member mounted on said frame for rotation about a fixed axis, and

3. actuating means for rotating said second gear member, said moving means moving said first gear member into and out of meshing engagement with said second gear member when said washing roller is moved into and out of said position thereof by said moving means.

2. In a machine as set forth in claim 1, a rubber coating constituting said circumferential portion of said washing roller, said liquid supply means including a container and filling means for filling said container with washing liquid, said rubber coating dipping in said liquid when said container is filled with liquid and said rubber coating engages said cylinder.

3. In a machine as set forth in claim 1, said moving means including yieldably resilient means for urging said washing roller toward said blanket cylinder.

4. In a machine as set forth in claim 3, a hanger pivotally mounted on said frame, said roller being mounted on said hanger for rotation about said axis thereof, said yieldably resilient means engaging said hanger and urging the same to pivot in a direction to move said washing roller toward said blanket cylinder, said moving means further including cam operated motion transmitting means for pivoting said hanger against the urging of said yieldably resilient means.

5. In a machine as set forth in claim 4, said motion transmitting means including a cam member mounted on said frame for movement about an axis, said cam member having a substantially circularly arcuate face about the axis thereof and being formed with two communicating recesses of different radial depth in said face, a cam follower member mounted on said frame for movement along said face and into and out of said recesses when said cam member rotates about the axis thereof, means linking said cam follower member to said hanger for movement of said roller from a rest position remote from said cylinder, in which said first and second gear members are disengaged, to an idling position remote from said cylinder, in which said gear members are engaged for rotating said roller, when said cam follower member moves from said face in the recess of smaller radial depth, and for movement of said roller from said idling position into a working position when said cam follower member moves from said recess of smaller depth into the recess of greater radial depth, in said working position of the roller said gear members being engaged and said circumferential portions being engaged, and operating means for rotating said cam member about the axis thereof.

6. In a machine as set forth in claim 5, a guard member mounted on said frame for rotation about said axis of the cam member axially adjacent the cam member, said guard member having a substantially circularly arcuate face portion coaxial with said face of the cam member and of substantially the same radius, biasing means interposed between said cam member and said guard member for turning said guard member into an angular position in which said face portion and said face jointly form a substantially complete circle about the axis of the cam member and movement of said cam follower member into said recesses is prevented, and cooperating abutment means on said cam follower member and said guard member for moving said guard member away from said angular position thereof against the force of said biasing means when said cam member is turned in one direction and for thereby permitting sequential movement of said cam follower member into said recesses.

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