Feb. 4, 1969 A. G. R. GATES 3,425,345

APPARATUS FOR APPLYING A LIQUID TO ROTARY SURFACES OF PRINTING MACHINES

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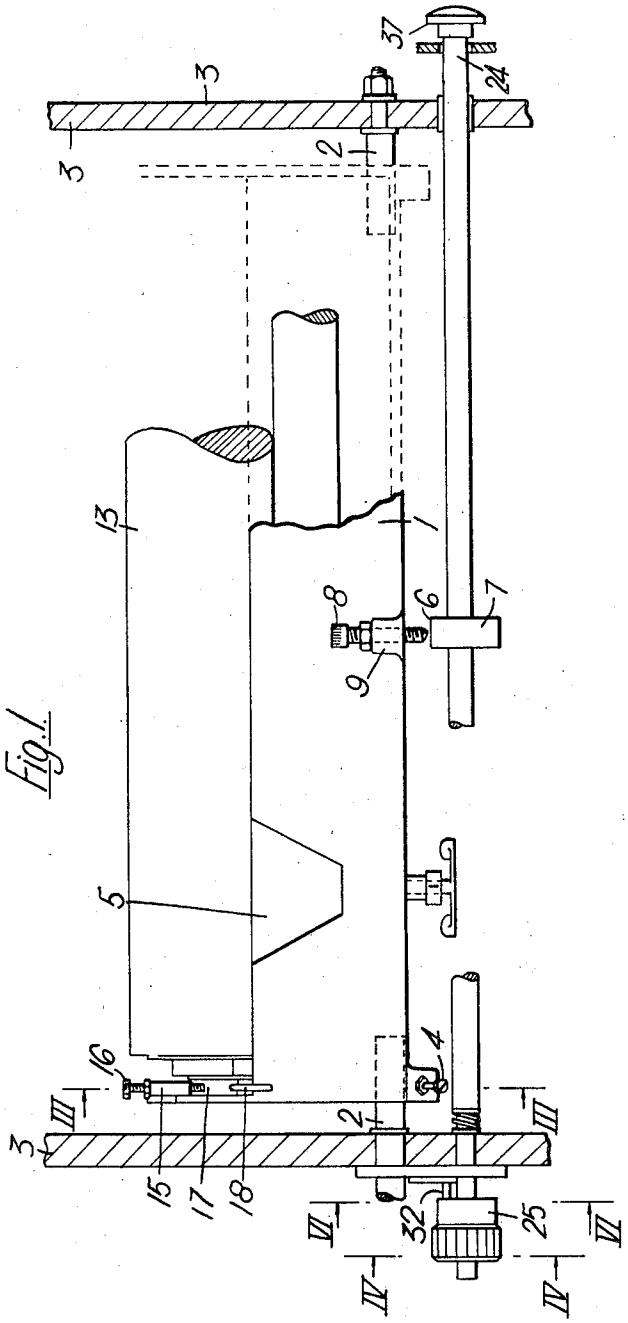


Fig. 1

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Fig. 2.

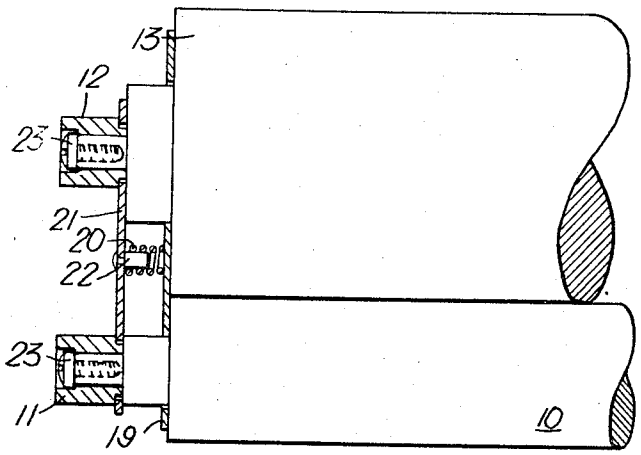
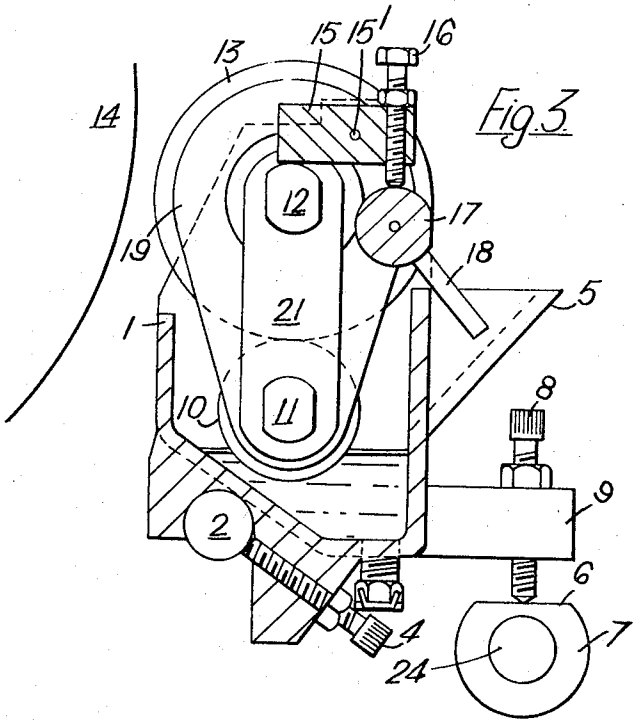
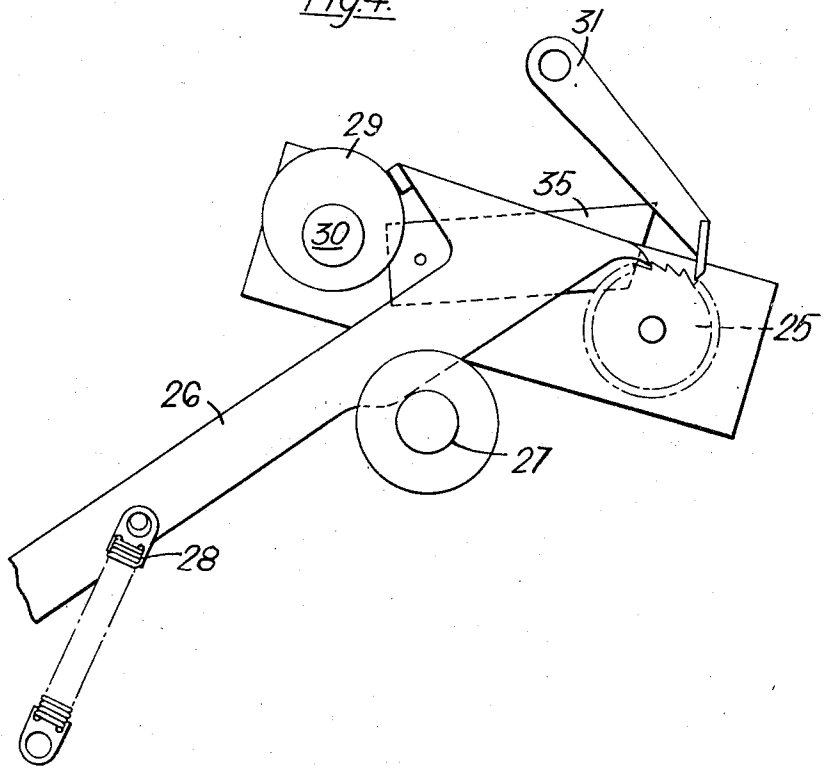


Fig. 3



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Fig.4.



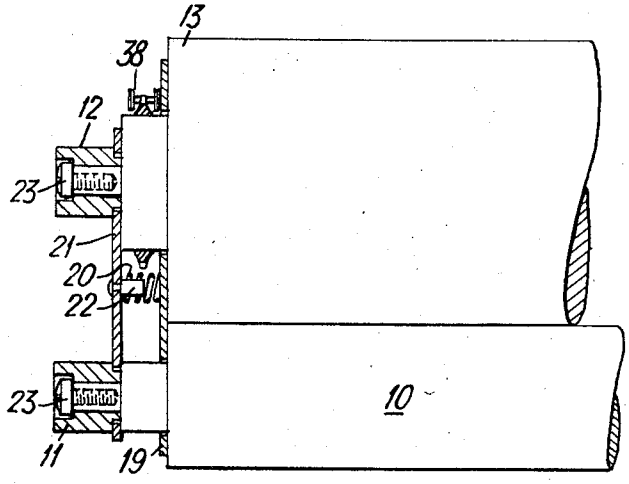


Fig.7.

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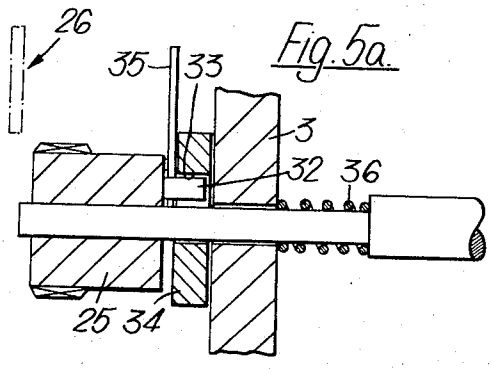


Fig. 5a.

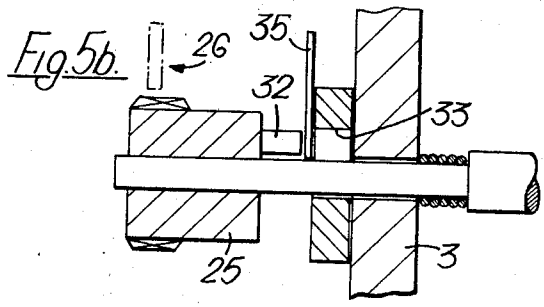


Fig. 5b.

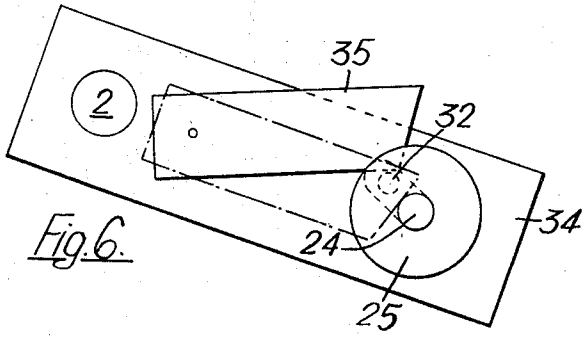


Fig. 6.

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APPARATUS FOR APPLYING A LIQUID TO ROTARY SURFACES OF PRINTING MACHINES

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U.S. Cl. 101—148 17 Claims
Int. Cl. B41l 25/02; B41f 31/26

ABSTRACT OF THE DISCLOSURE

This invention provides apparatus for applying a liquid to a rotary surface of a printing machine, comprising a pair of contacting rotating rollers one arranged for partial immersion in liquid in a reservoir; the other roller being arranged for transfer of liquid from the one roller to a rotary surface, the assembly of rollers and reservoir being pivotable between a liquid applying position and an inoperative position by a mechanism driven by the printing machine and incorporating an adjustable timing device which after initiation of a manual control, holds the roller assembly in contact with the rotary surface for a predetermined number of cycles of the printing machine and then automatically activates pivoting back to the inoperative position.

This invention relates to apparatus for applying a liquid, e.g. for cleaning or dampening purposes, to rotary surfaces of printing machines. Such apparatus may, for example, be apparatus for washing the blanket on the blanket cylinder of an off-set duplicator or be apparatus for applying a priming or dampening solution to the plate on a plate cylinder of such a duplicator.

It is usual for apparatus of this character to be movable between an operative position in which a liquid applying member engages the cylinder or an element thereon to which liquid is to be applied and an out-of-the-way position in which the liquid applying member is spaced from the cylinder or element thereon. Further, it is desirable that the period of time for which the liquid applying member is engaged with the cylinder or element thereon be variable.

In many machines, this facility is provided by the liquid applying member being manually movable between its operative and out-of-the-way positions, the operator holding the member in its operative position for as long as is desired.

It is an object of this invention to provide apparatus of this character in which the movement of the liquid applying member between its operative and out-of-the-way positions is carried out automatically and the period of time for which the member remains in its operative position is variable.

According to this invention, there is provided apparatus for applying a liquid to a rotary surface in a printing machine, comprising a liquid applying member adapted to be supplied with liquid and means operatively connectible to the printing machine drive for effecting movement of such member into engagement with the surface to which liquid is to be applied and then out of engagement with the said surface, said means including a timing mechanism responsive to the operation of the printing machine drive and controlling operation of said means and adjustable for varying the number of cycles of the printing machine for which said means operates.

Advantageously, according to a further feature of the invention, the said means for effecting movement of the liquid applying member comprises a cam, rotation of which through one revolution causes movement of the liquid applying member to its operative position, retention of the member in this position for the major part of such revolution and then return of the member to its out-of-the-way position, and a clutching mechanism for connecting the cam to an element adapted to be driven by the printing machine, said clutching mechanism automatically disconnecting the cam from the driven element when the cam has completed one revolution, the timing mechanism controlling the rate at which the said cam rotates. Preferably, according to a further feature of the invention, the said driven element is a pawl adapted to be reciprocated by the printing machine drive at a constant rate and the said cam has associated therewith a ratchet adapted to be engaged by said pawl and means are provided for varying the stroke of the pawl to vary the number of reciprocations of the pawl which are required to rotate the ratchet through one revolution. Conveniently, the said pawl is driven from the drive of the printing machine so as to perform one reciprocation for each machine cycle. Advantageously, the means for varying a stroke of the pawl comprises an adjustable stop for varying the end position of the return stroke of the pawl. Conveniently, the said stop is provided by a cam element against which a part of the said pawl engages.

In a preferred construction, a manual control which operates said clutching mechanism is provided for initiation of the liquid applying operation. Advantageously the clutching mechanism is of a construction such that it effects movement of said rachet into and out of engagement with the pawl.

The liquid applying member may advantageously comprise a roller. Conveniently, the roller forms part of a roller assembly comprising a first roller which is adapted to be partially immersed in a trough containing liquid and a second and large roller which forms the liquid applying member and which is adapted to be in pressing contact with the first roller. In a preferred construction, the roller assembly is mounted on the said trough and the latter is pivotally mounted to enable the whole assembly to be swung to move the liquid applying roller between its operative and its out-of-the-way position.

An illustrative embodiment of the invention comprising apparatus for cleaning the blanket cylinder of an off-set duplicator will now be described with reference to the accompanying drawings, in which:

FIGURE 1 is an elevational view of the cleaning apparatus, with parts broken away;

FIGURE 2 is a fragmentary elevational view, on an enlarged scale, of one end of the roller assembly of the apparatus of FIGURE 1;

FIGURE 3 is a sectional view, on an enlarged scale, taken on the line III—III of FIGURE 1 and shows the roller assembly in its out-of-the-way position relative to the blanket cylinder of the duplicator;

FIGURE 4 is a side elevation of part of the driving means for moving the roller assembly between its operative and out-of-the-way positions as seen on the line IV—IV of FIGURE 1; and illustrating the timing mechanism for varying the period of time the roller assembly is in its operative position;

FIGURES 5*a* and 5*b* are fragmentary sectional views illustrating the clutching means whereby the roller assembly is clutched into and out of the duplicator drive;

FIGURE 6 is a side elevation of part of a clutching means as seen on line VI—VI of FIGURE 1; and

FIGURE 7 is a view, similar to that of FIGURE 2, showing an alternative embodiment of the apparatus of the invention.

Referring to the drawings, the cleaning apparatus illustrated comprises a cleaning fluid trough **1** pivotally mounted at each end on a stud **2** projecting inwardly

from the appropriate side plate 3 of the duplicator. The trough 1 is retained against being lifted off the studs 2 by means of two screws 4. The pivoting axis of the trough 1 is to one side of the trough as shown clearly in FIGURE 3. The other side of the trough 1, which is provided with a filling channel 5, is supported on a flat 6 of a cam 7 by means of an adjusting screw 8 passing through a lug 9 projecting outwardly centrally of the appropriate side of the trough.

A rubber roller 10 is rotatably mounted at its ends in bearings 11 (FIGURE 2) engaging in vertical channels (not shown) in the inner surfaces of the ends of the trough 1. Part of the outer surface of the roller 10 is immersed in cleaning fluid in the trough 1. Rotatably mounted above the roller 10 in bearings 12 also engaged in said channels in the ends of the trough is a larger diameter roller 13 which is in pressing contact with the roller 10 and is in a position to engage the blanket cylinder 14 (FIGURE 3) when the trough is pivoted on the studs 2. Above each of the bearings 12 for the larger roller 13 is mounted one of a pair of pivotally mounted pressure blocks 15 which retain the bearings in the said channels in the trough ends and apply the contact pressure between the rollers. The blocks 15 are pivotable about a shaft 15' secured to the adjacent end wall of the trough 1. Adjustment of the blocks 15 controls the pressure between the two rollers 10 and 13, such adjustment being effected by means of an adjusting screw 16. To enable this pressure to be released when the apparatus is not in use, a night latch is provided comprising a cam 17 which is engaged by the adjusting screw 16 and a lever 18 by which the cam may be swung about its axis. Appropriate rotation of the cam 17 will cause pivoting of the blocks 15 resulting in lifting of the left hand ends and thereby release the contact pressure between the two rollers.

An end seal is provided, at each end of the assembly formed by rollers 10 and 13, for the purpose of preventing liquid, which clings to the end face of the lower roller, from working its way round to the side of the upper roller nearer to the blanket cylinder 14. Such end seal comprises a thin plate 19 held against the ends of the rollers under light pressure from a spring 20 located between the plate 19 and a retaining plate 21 as clearly shown in FIGURE 2. The retaining plate 21 has suitably shaped slots therein to receive the shafts of rollers 10 and 13 and to provide for vertical movement of roller 13 relative to roller 10. The spring 20 is retained in position by being mounted on a stud 22 and the bearings 11 and 12 are retained in position by screws 23 engaging in the respective journals of the rollers 10, 13.

Movement of the assembly formed by the trough 1, rollers 10 and 13 and the parts associated therewith is effected by rotation of cam 7. This rotation is derived from the drive of the duplicator to which the apparatus is applied. To this end, the cam 7 is secured on a spindle 24 which carries on one end thereof (the left-hand end in FIGURE 1) a ratchet 25 adapted to be rotated by a pawl 26 (see FIGURE 4). The pawl 26 is connected to a jogger operating mechanism (not shown) driven from the drive of the duplicator so as to make one reciprocation for each rotation of the blanket cylinder. The pawl 26 is guided in its movement by a guide roller 27 and the jogger mechanism is such that the pawl is positively advanced to a forward position and then allowed to return to a rearward position under the action of a return spring 28. The length of the stroke of the pawl 26 is controlled by a timing mechanism comprising an eccentric 29 mounted on a shaft 30. This eccentric 29 forms an adjustable back stop to define the rearward end of the return stroke of the pawl 26. A second pawl 31 also engages the ratchet wheel 25 to prevent return movement of the ratchet wheel after it has been rotated by the pawl 26.

It will be appreciated that, when the pawl 26 is in engagement with the ratchet wheel 25, reciprocation of the pawl 26 will cause rotation of the wheel 25 and thereby rotation of the cam 7. The amount by which the ratchet wheel 25 will be rotated for each stroke of the pawl 26 will depend on the length of this stroke and therefore on the angular position of the eccentric 29. The pawl 26 is not, however, always in engagement with the ratchet wheel 25, there being a clutching means between the pawl and ratchet wheel.

The clutching means, illustrated clearly in FIGURES 5*a*, 5*b* and 6, comprises a pin 32 projecting axially inwardly from the ratchet wheel 25 and engaging in a slot 33 in a back plate 34 when the ratchet wheel 25 is not in engagement with the pawl 26, as shown in FIGURE 5*a*. In this position, a latch 35 pivoted to the plate 34 rests on the pin 32. The spindle 24 is capable of being moved axially to the left (as viewed in FIGURE 1) by depression of an operating knob 37 on the right-hand end of the spindle to move the ratchet wheel 25 into the position shown in FIGURE 5*b* in which it is in engagement with the pawl 26. The spindle 24, is, however, normally held in the position shown in FIGURE 5*a* by a spring 36. The operation of the above described apparatus is as follows:

When the machine operator wishes to clean the blanket cylinder 14, the spindle 24 is moved to the left as shown in FIGURE 1 to move the ratchet wheel 25 into engagement with the reciprocating pawl 26. This movement of the ratchet wheel disengages the pin 32 from the slot 33 in the plate 34 and the latch 35 drops as shown in FIGURE 5*b*, to prevent the pin, and thereby the ratchet wheel 25, from returning to its original position. Reciprocation of the pawl 26 rotates the ratchet wheel 25 which in turn rotates the cam 7 so that the screw 8 is engaged by the arcuate portion of the cam and the trough is pivoted towards the blanket cylinder so that the roller 13 engages the latter. The roller 13 is rotated by its frictional contact with the rotating cylinder 14 and in turn rotates the roller 10 which, being partially immersed in cleaning liquid in the trough 1, washes ink transferred from the cylinder 14 from the roller 13. The roller 13 remains in contact with the cylinder 14 until the ratchet wheel 25 has been rotated a full revolution at which time the screw 8 engages the flat 6 of the cam 7 and the trough is pivoted to the out-of-the-way position. At the same time, on completion of one revolution of the ratchet wheel 25 the pin 32 lifts the latch 35 and enters slot 33 so that the ratchet wheel 25 moves out of engagement with the pawl 26 and no further movement of the trough occurs.

Adjustment of the length of time for which the roller 13 remains in engagement with the cylinder 14 is effected by rotation of the eccentric 29 which varies the rearward end position of the return stroke of the pawl 26 anud thereby determines by how mandy teeth the ratchet wheel is rotated on each forward stroke of the pawl 26 and thus the number of revolutions of the blanket cylinder which are required to effect one complete revolution of the ratchet wheel 25.

Although the roller 13 is described as being rotated by frictional contact with the rotating cylinder 14 in the opposite direction to that of rotation of cylinder 14, it would be possible to drive roller 13, either in the same direction of rotation as cylinder 14 or in the opposite direction, by some other suitable means, such as the chain drive 38 in FIGURE 7.

If the roller 13 is rotated in the opposite direction of rotation to that of the cylinder 14, then advantageously the surface speed of the roller 13 is greater than that of cylinder 14. This enables the excess cleaning fluid to be scavenged away from the gap between cylinder 14 and roller 13.

We claim:

1. For a printing machine including a rotary surface and means for driving said surface, apparatus for apply-

ing a liquid to said rotary surface, such apparatus comprising a liquid applying member mounted for movement between a liquid applying position and an inoperative position; means supplying liquid to said liquid applying member; a cam operatively connected to said liquid applying member, said cam being contoured for moving said liquid applying member into its liquid applying position, retaining said member in such position, and returning said member to its inoperative position all during one rotation of the cam; a driving member operatively connectable with the drive means of said printing machine; a driven element operatively connected to said cam; a clutching mechanism operative to connect said driven element to said driving member for rotation thereby; means associated with said clutching mechanism and disconnecting said driven element from said driving member after one revolution of said cam; and a timing mechanism controlling the rate of rotation of said cam and adjustable for varying the period of time for which said liquid applying member is retained in its liquid applying position.

2. Apparatus according to claim 1, and including a manually operable control associated with said clutching mechanism for initiation of operation thereof.

3. Apparatus according to claim 1, wherein said liquid applying member comprises a roller.

4. Apparatus according to claim 3, wherein said roller forms part of a roller assembly comprising:

first and second rollers;

the second roller being larger than said first roller, and forming said liquid applying member;

said first and second rollers being arranged in pressing contact with one another, and wherein the apparatus includes a reservoir for liquid, said first roller extending into said reservoir.

5. Apparatus according to claim 4, wherein said roller assembly is mounted on said reservoir:

said reservoir being pivotably mounted for movement between liquid applying and inoperative positions.

6. Apparatus according to claim 4, including means for varying the contact pressure between said first and second rollers.

7. Apparatus according to claim 6, wherein said contact pressure varying means includes:

a pivotally mounted arm having two spaced ends, one end of said arm bearing against one of said roller and urging said two rollers into pressing contact, the other end of said arm having an adjustable abutment surface, a camming surface arranged for contact with said abutment surface and having a raised portion and a recessed portion, adjustment of said abutment surface providing adjustment of said contact pressure, and said raised and recessed portions of said camming surface corresponding to liquid applying and inoperative positions of said roller assembly.

8. Apparatus according to claim 3, including means operably connected to said means for driving said surface and to said roller and effective to rotate said roller in the same direction of rotation as said rotary surface.

9. Apparatus according to claim 8, wherein said roller rotating means comprises a chain drive.

10. Apparatus according to claim 3, including means for rotating said roller with a periphera speed greater than that of said rotary surface, said means being operatively associated with said roller and said means for driving said rotary surface.

11. Apparatus according to claim 10, wherein said means for rotating said roller comprises a chain drive.

12. Apparatus according to claim 1 and including: a ratchet, constituting said driven element, associated with said cam; a pawl, constituting said driving member, and connectible to the printing machine drive for reciprocation at a constant rate; and means for varying the stroke of the oscillation of said pawl to vary the number of reciprocations of said pawl which are required to rotate the ratchet through one revolution.

13. For a printing machine including a rotary surface and means for driving said surface, apparatus for applying a liquid to said rotary surface, such apparatus comprising: a liquid applying member mounted for movement between a liquid applying position and an inoperative position; means supplying liquid to said liquid applying member; a cam operatively connected to said liquid applying member, said cam being contoured for moving said liquid applying member into its liquid applying position, retaining said member in such position, and returning said member to its inoperative position all during one rotation of the cam: a shaft on which said cam is mounted; a ratchet also mounted on said shaft so as to rotate with said cam; a pawl operatively connectible to said printing machine drive for reciprocation at a constant rate; means for varying the stroke of the oscillation of said pawl; means for moving said ratchet into engagement with said pawl; and means for moving said ratchet out of engagement with said pawl when the ratchet has executed one revolution.

14. Apparatus according to claim 2, wherein said means for varying the stroke of said pawl comprises:

an adjustable stop positioned to define the end position of the return stroke of the pawl.

15. Apparatus acording to claim 14, wherein said stop comprises:

a cam element engaging said pawl.

16. A printing machine having a driven rotary surface, drive means generally associated with said rotary surface; a liquid applying member movable between a position of contacting relationship with said rotary surface and an inoperative position; transmission means connected to said drive means and effective to move said liquid applying member between said positions; a manual control associated with said transmission means for initiating movement of said liquid applying member from inoperative to surface-contacting positions, and adjustable timing means associated with said drive means and said transmission means; said timing means initiating return movement of said liquid applying member from surface-contacting to inoperative positions after a predetermined adjustable number of revolutions of said drive, said transmission means including a clutching device operable by said manual control and effective to disconnect said liquid applying member from said drive means; said transmission means further includes a pawl reciprocable by said means and performing one reciprocation during each rotation of said drive means.

17. For a printing machine including a rotary surface and means for driving said surface, apparatus for applying a liquid to said rotary surface, such apparatus comprising: a liquid applying member mounted for movement between a liquid applying position and an inoperative position; means supplying liquid to said liquid applying member; a ratchet; means rotatable with said ratchet for effecting said movement of the liquid applying member; a pawl engageable with said ratchet for rotating the same and operatively connectible to said printing machine drive means for reciprocation at a constant rate; and means for varying the stroke of oscillation of said pawl to vary the rate at which said ratchet is rotated by the pawl.

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U.S. Cl. X.R.

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