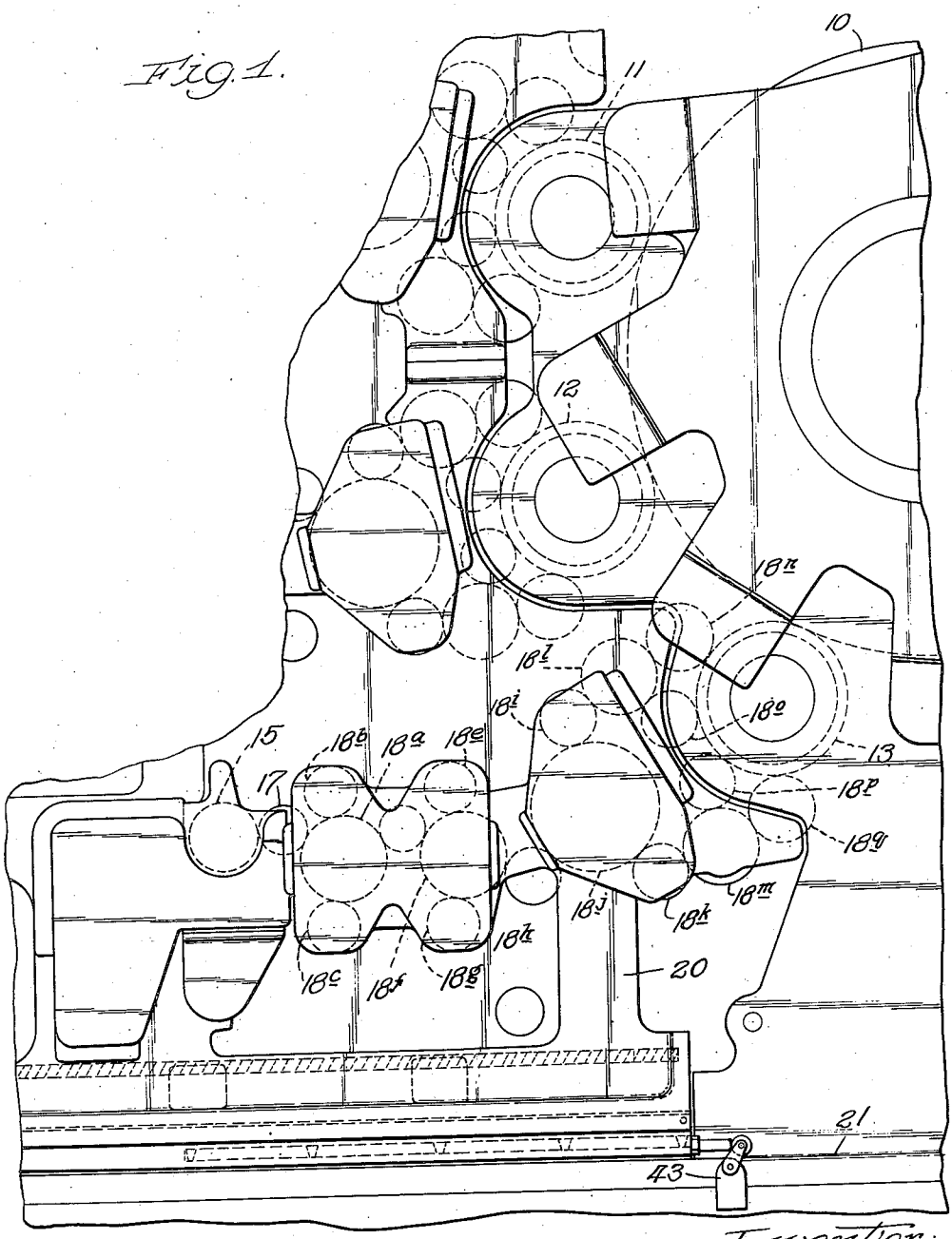
Jan. 25, 1949. C. S. CRAFTS 2,459,922

LIQUID FEED CONTROL, PARTICULARLY FOR THE INK FEED OF PRINTING PRESSES

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Fig. 1.



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Fig. 2.

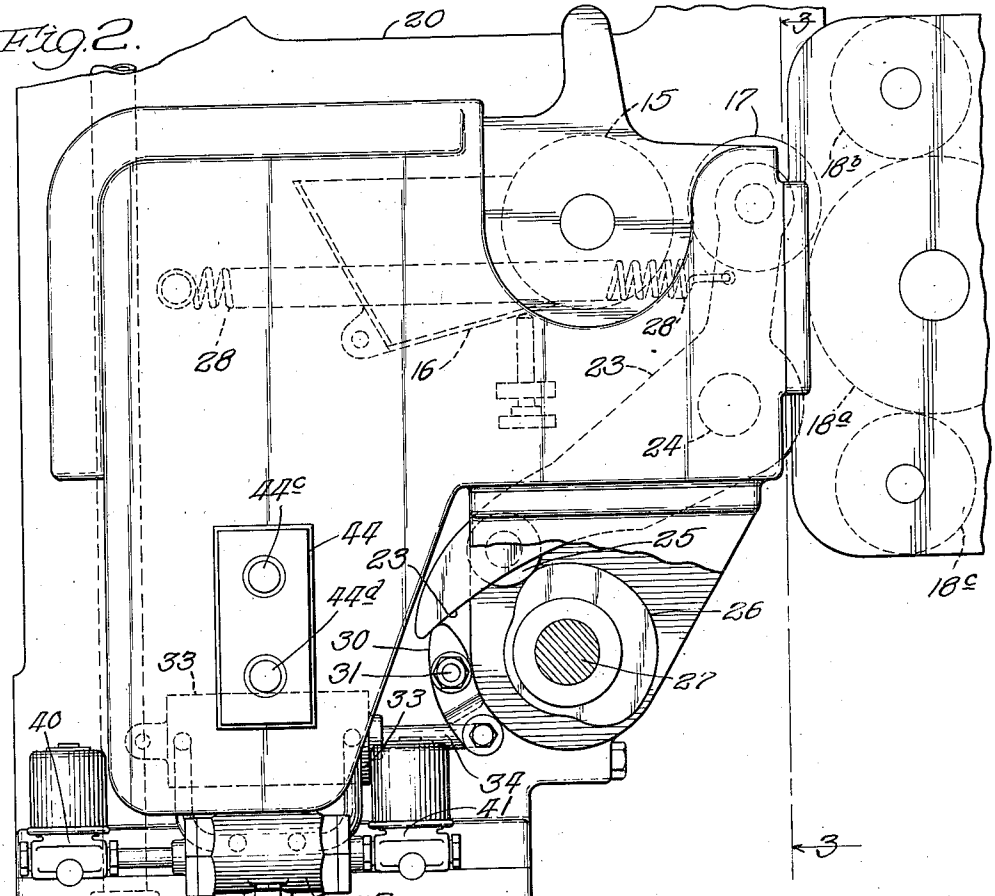
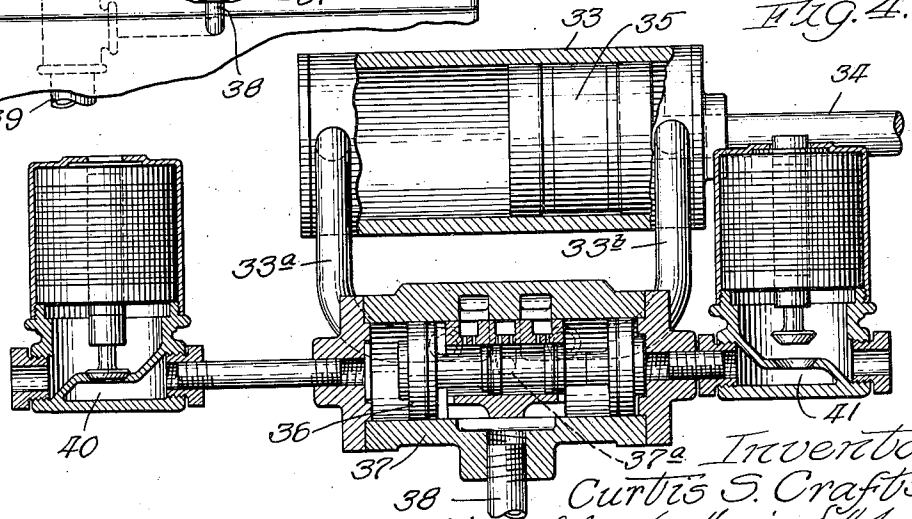


Fig. 4.



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Filed Dec. 27, 1946 3 Sheets-Sheet 3

Fig. 3.

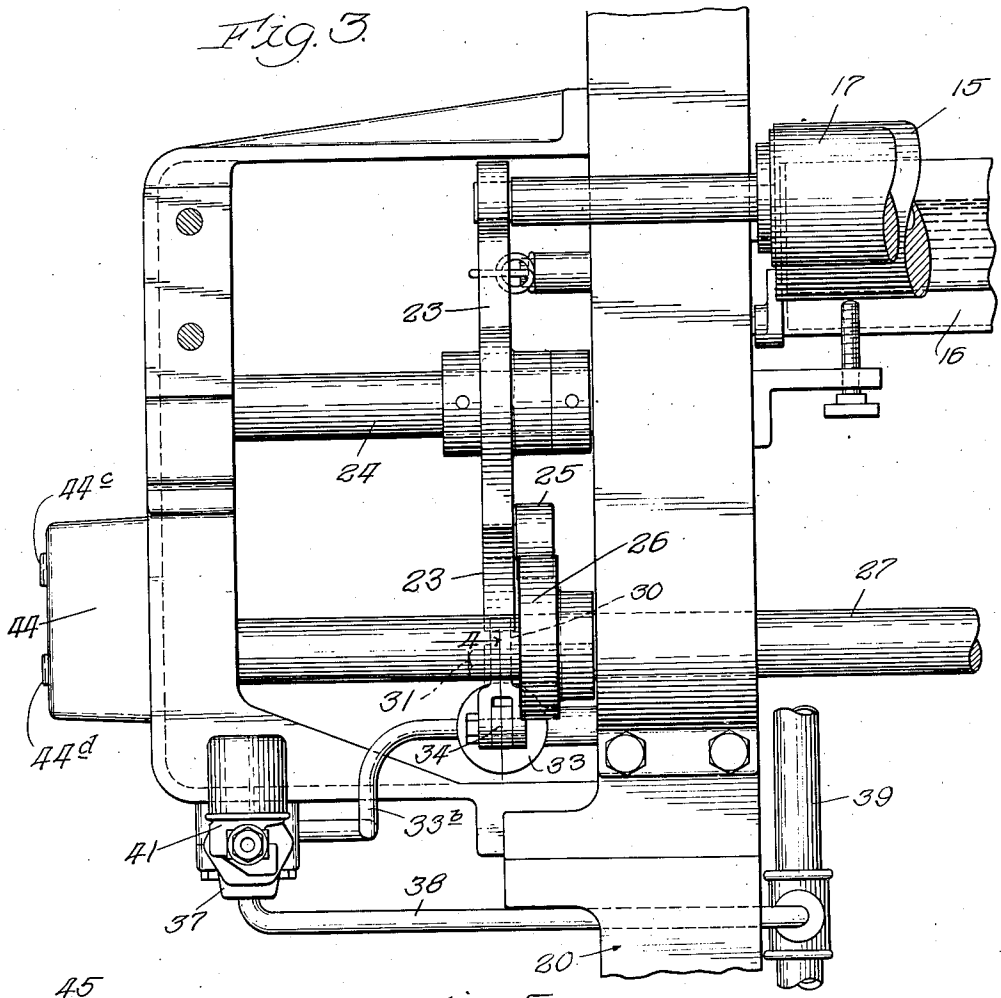
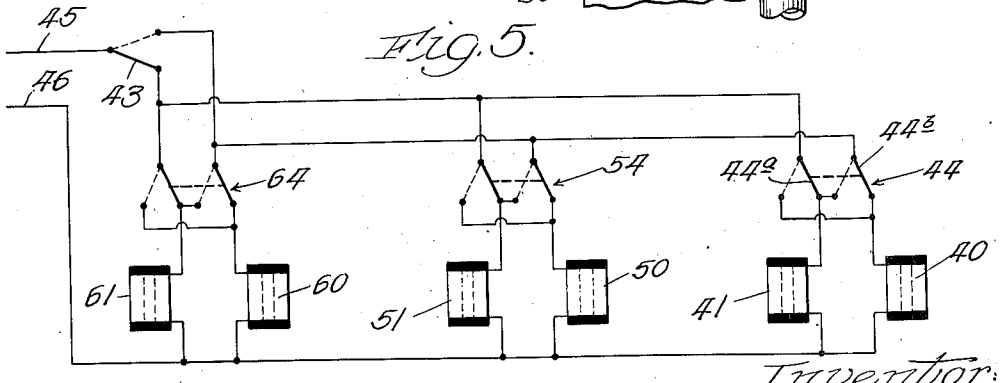


Fig. 5.



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UNITED STATES PATENT OFFICE

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LIQUID FEED CONTROL, PARTICULARLY FOR THE INK FEED OF PRINTING PRESSES

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12 Claims. (Cl. 101—351)

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This invention relates to a liquid feed control, particularly to an ink feed control for printing presses.

In large high speed printing presses, particularly multi-color presses, it is quite common to have the inking mechanism for a plate cylinder, particularly where there is a multiple inking arrangement, mounted on a carriage movable toward and away from the plate cylinders, associated with a main or impression cylinder. In order to avoid imperfect printing, such presses usually incorporate means for automatically moving the carriage back away from the plate cylinder, or the plate cylinders away from the impression cylinder, when the press is operating at a speed below the designed operating speed, as during acceleration and deceleration. While the carriage may also be manually unlocked and moved much further away when desired for cleaning and re-inking the inking rolls, changing rolls, and the like, it is this automatic movement, usually in the neighborhood of two or two and one-half inches, with which I am particularly concerned here. Since this is conventional in the art it is felt unnecessary to go into the details of mechanism therefor.

While this automatic movement of the ink carriage away from the plate cylinder has been advantageous in preventing inking the web during acceleration and deceleration of the press, it has proved objectionable in that heretofore the distributing rolls have loaded up too heavily with ink during the period of operation in which the parts were still continuing to move, but the carriage was withdrawn from operative relation with the cylinder.

I have devised and am here disclosing and claiming an arrangement for retaining all the advantages of this automatic carriage movement while at the same time obviating disadvantages previously resulting therefrom. In a large printing press of this type it is conventional to transfer ink from the fountain roll to distributing rolls by a ductor roll which reciprocates in a path transverse of its axis to intermittently make contact first with the fountain roll and then with the distributing roll to transfer ink thereto.

I have devised an arrangement operative upon the ductor roll mounting, in a fully automatic manner, to move the ductor roll away from the fountain roll and lock it against return thereto during periods when the inking carriage is withdrawn from printing position, thus preventing loading up of the distributing rolls during acceleration and deceleration periods. In addition,

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I have incorporated in the arrangement means whereby the ductor roll moving mechanism may be caused to operate, regardless of the carriage position, when this may be desirable, as in reinking a given set of rolls after they have been cleaned, or the like. My present invention thus automatically prevents ink feed to the distributing rolls and loading up of ink thereon during periods when the carriage is in inoperative position, while at the same time permitting a given ink feed mechanism to be rendered operative when the other mechanisms are inoperative, or vice versa, as there may be times when the carriage is in printing position that it may be preferable to have a given ink feed mechanism inoperative.

The various features and advantages of this invention will be apparent from the specification and drawings, in which:

Figure 1 is a fragmentary side elevational view of a printing press embodying my invention; Figure 2 is an enlarged fragmentary side elevational view, partially broken away, of a portion of the apparatus shown in Figure 1; Figure 3 is a partially transverse view along the line 3—3 of Figure 2; Figure 4 is a vertical sectional view, still further enlarged, of a portion of the apparatus shown in Figure 2; and Figure 5 is a diagram of the control circuit for automatic actuating of the power operated means effecting the ink feed control.

In the particular embodiment of my invention illustrated herewith, a multi-color press is shown as having a main or impression cylinder 10 with three plate cylinders 11, 12 and 13 associated therewith, each having an associated inking arrangement, it being understood that the plate cylinders and their inking means may be of any number desired, three being illustrated merely as representative. Since the general principles and operation of such presses are so well known, and since the plate cylinders and their associated inking arrangements are duplicates, only the lowermost inking arrangement illustrated in Figure 1, that associated with the plate cylinder 13, will be described in detail.

Referring now more particularly to this one inking arrangement, it will be seen to comprise a fountain roll 15 associated with an ink fountain 16 (best seen in Figure 2). A ductor roll 17 is so mounted as to be oscillable or reciprocal, transversely of its axis, between a left hand position (speaking with respect to the apparatus as viewed in the drawings) where it contacts the fountain roll 15 to a right hand position where it contacts

the roll 18a of the group of rolls having distributing and transfer functions and hereinafter termed the distributing rolls, these being identified as 18a—18q, the rolls 18n—18q being in engagement with plate 13 to deliver ink thereto. Some of these rolls may, in conventional manner, be movable axially as well as being rotatable. All of the inking mechanisms are mounted on an inking carriage here identified in general as 20, this being horizontally movable on appropriate rails on the bed 21 of the press.

Referring now more particularly to Figures 2 and 3, it will be seen that the ductor roll 17 is carried on a mounting frame 23 pivotally mounted on the shaft 24 and having near its lower end a cam follower or cam roller 25 adapted to be held in engagement with the surface of a cam 26 rigidly mounted on the rotatable shaft 27 driven by the main press drive. Rotation of the cam 26, in cooperation with the force of the spring 28 tending to pull the ductor roll 17 toward the fountain roll 15, causes the desired reciprocal movement of the ductor roll back and forth between the fountain roll and the distributing roll 18a, in the absence of any means for preventing this action.

In order to prevent this movement of the ductor roll, and thus to prevent further ink feed, I provide power operated means for forcing the ductor roll carriage to and locking it in the position shown in Figure 2, this comprising the camming lever 30 pivotal about the stud 31 and means for automatically effecting movement of this lever. The camming lever is shown in Figure 2 in its feed preventing position, and it is adapted to be rotated clockwise about its pivot point (as viewed in the drawing) through an angle of about 60° to an inoperative position where it causes no interference with reciprocation of the ductor roll carriage 23 through the cam drive action therefor.

Movement of the camming lever 30 is effected by a conventional double acting air motor 33 having its piston rod 34 connected to the lower end of the camming lever 30. Air is admitted to either side of the piston 35 under the control of a valve member 36 movable in a valve box 37, as may be best seen in Figure 4. Air under pressure is supplied to the valve box 37 through a pipe 38 connecting to a compressed airline 39, and air is adapted to be exhausted from either side of the valve member 36 when the solenoid exhaust valves 40 and 41 are opened electrically, through operation of the control circuit to be hereafter described. The air motor, valve box therefor, and solenoid valves are all conventional articles purchased on the open market, and their construction will, therefore, not be described in detail. The parts are shown in Figure 4 in position resulting from the solenoid valve 41 being open, the valve member 36 being to the right-hand limit of its movement and air under pressure being delivered through the pipe 33a, air being exhausted through the pipe 33b and the exhaust opening 37a in the valve box. When the solenoid valve 41 is closed, on the other hand, and the valve 40 opened, both the valve member 36 and the motor piston 35 would move to the left, resulting in swinging of the ink feed control lever 30 to an inoperative position where it permits ink feed to take place.

Because of the relationship of the upper end of the camming lever 30 and the portion of the ductor roll frame 23 with which it cooperates, the lever is not merely capable of latching or locking the ductor roll away from contact with the fountain roll 15, but is also capable of camming or forcing the ductor roll away from the fountain roll, against the force of the spring 28, if the air motor is actuated to ink feed preventing position when the ductor roll happens to be in contact with the fountain roll.

In order to effect automatic operation of the ink feed control means in all of the ink feeding arrangements, and at the same time permit a difference in the relationship of one ink feed control with respect to the others when desired, I provide a switching arrangement for controlling the solenoid valves. This will now be described, with particular reference to Figure 5. While the mechanical parts are shown in Figure 1 in printing relationship, so that their interaction may be better understood, the views of Figures 2 to 5 are shown when ink feed is blocked, as when the ink carriage 20 has been moved to the left (speaking with respect to Figure 1). Referring to Figure 5, the solenoids 40 and 41 are those of the valves shown fully in Figure 4; and other similar solenoids 50 and 51 and 60 and 61 are associated with the control valves for the air motors of the other two ink feeding arrangements in the particular three color press arrangements illustrated as representative. A limit switch 43, which may be a single pole double throw switch as illustrated in Figure 5, is preferably of the type having its movable member spring pressed to one contacting position and adapted to be urged to the other contacting position (shown in dotted lines in Figure 5) when the inking carriage is in operative or printing position. Each pair of solenoid valves has associated therewith a manually controllable switch, as the switch 44 of the double pole double throw type. This switch may have movable contact members 44a and 44b mechanically connected together and adapted to be moved from one contacting position to the other by any appropriate means, as by pushing on the buttons 44c and 44d (see Figure 2). The other inking arrangements have similarly manual controllable switches indicated in general as 54 and 64. When all of the switches just mentioned are in the position for similar automatic operation (as illustrated in Figure 5), movement of the inking carriage away from the plates causes the switch 43 to assume the position shown in solid lines, thus energizing the solenoid valves 41, 51 and 61 from any conventional source of power supplied by the lines 45 and 46, this resulting in all of the ductor rolls being maintained away from their associated fountain rolls, so that ink feed is prevented. On the other hand, with the switches 44, 54 and 64 in the same position, movement of the inking carriage to printing position (when the press is up to operating speed) moves the limit switch 43 to the position shown in Figure 1 (the dotted line position in Figure 5), resulting in energization of the solenoid valves 40, 50 and 60 and movement of the ink feed control means to inoperative position where ink feed may take place through the normal reciprocating operation of the ductor rolls. On the other hand, if it is desired to have any one of the inking arrangements operating when the inking carriage is back away from the plates (or any one of the inking arrangements inoperative when the inking carriage is in printing position), it is only necessary to reverse the setting of the manual control switch for this particular inking arrangement, as by pushing the buttons 44d and 44c to their dotted line positions. This results in the reverse ener-

gization of the solenoids 40 and 41, with respect to the remaining solenoids, for any position of the limit switch. If a given inking arrangement is to be cleaned and have the ink changed therein, for example, this enables this inking arrangement to be rendered operative, even though the inking carriage is in inoperative position and the other inking arrangements are inoperative, until the rolls have been properly inked, whereupon the system can be thrown back into proper relationship with the other inking arrangements by pushing the button 44c. Similarly, any given inking arrangement can be thrown out of operation when the remaining inking arrangements are all operative if such should be desired, by pushing its reverse button, as 44d.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims.

I claim:

1. In liquid transfer apparatus: a liquid supply source; distributing apparatus; a movable device for delivering liquid from said source to said distributing apparatus; power operated apparatus controlling operation of said delivery device; and electrical apparatus automatically controlling operation of said power operated apparatus for preventing operation of said delivery device during periods of operation of said transfer apparatus when liquid transfer is not desired.

2. In printing apparatus: a plurality of feed arrangements, each arrangement including a printing liquid supply source, distributing apparatus, a device for delivering printing liquid from said source to said distributing apparatus, and power operated control apparatus for controlling operation of said delivery device, said power operated apparatus being movable between a first position where it prevents said delivery device from delivering printing liquid to said distributing apparatus and a second position where it permits said delivery device to deliver printing liquid to said distributing apparatus; electrical control apparatus for automatically controlling operation of said power operated apparatus between said first and second positions; and switch apparatus for reversing the position of a selected one of said control apparatuses with respect to the other control apparatus.

3. In a printing press having an ink feed carriage movable to and from printing position and a transfer cylinder for transferring ink to a web: an ink supply source on said carriage; distributing apparatus on said carriage for distributing ink uniformly on said transfer cylinder; a device movable independently of said carriage for delivering ink from said source to said distributing apparatus; and electrical apparatus for automatically preventing operation of said delivery device when said carriage moves from printing position.

4. In a printing press having an ink feed carriage movable to and from printing position and a transfer cylinder for transferring ink to a web: an ink supply source on said carriage; distributing apparatus on said carriage for distributing ink uniformly on said transfer cylinder; a device movable independently of said carriage for delivering ink from said source to said distributing apparatus; control apparatus for controlling operation of said delivery device, said control apparatus being movable between a first position where it prevents said delivery device from delivering ink to said distributing apparatus and a second position where it permits said delivery device to deliver ink to said distributing apparatus; and electrical apparatus for automatically effecting movement of said control apparatus in accordance with movement of said carriage.

5. In a printing press having an ink feed carriage movable to and from printing position and a transfer cylinder for transferring ink to a web: a plurality of feed arrangements on said carriage, each arrangement including an ink supply source, at least one distributing roll for distributing ink uniformly on said transfer cylinder, a device movable independently of said carriage for delivering ink from said source to said distributing apparatus, and power operated control apparatus for controlling operation of said delivery device, said power operated apparatus being movable between a first position where it prevents said delivery device from delivering ink to said distributing apparatus and a second position where it permits said delivery device to deliver ink to said distributing apparatus; and electrical control apparatus for effecting movement of said control apparatus by and in accordance with movement of said carriage.

6. In a printing press having an ink feed carriage movable to and from printing position and a transfer cylinder for transferring ink to a web: a plurality of feed arrangements on said carriage, each arrangement including an ink supply source, at least one distributing roll for distributing ink uniformly on said transfer cylinder, a device movable independently of said carriage for delivering ink from said source to said distributing apparatus, and power operated control apparatus for controlling operation of said delivery device, said power operated apparatus being movable between a first position where it prevents said delivery device from delivering ink to said distributing apparatus and a second position where it permits said delivery device to deliver ink to said distributing apparatus; electrical control apparatus for effecting movement of said first mentioned control apparatus by and in accordance with movement of said carriage; and switch apparatus for reversing the position of a selected one of said control apparatuses with respect to the other control apparatus.

7. In liquid transfer apparatus: a liquid supply source; distributing apparatus; a movable device for delivering liquid from said source to said distributing apparatus; power operated apparatus controlling operation of said delivery device, said power operated apparatus comprising a double-acting air motor; and electrical apparatus including at least one solenoid-operated valve for automatically controlling operation of said air motor for preventing operation of said delivery device during periods of operation of said transfer apparatus when liquid transfer is not desired.

8. In a printing press having an ink feed carriage movable to and from printing position and a transfer cylinder for transferring ink to a web: a plurality of feed arrangements on said carriage, each arrangement including an ink supply source, at least one distributing roll for distributing ink uniformly on said transfer cylinder, a device movable independently of said carriage for delivering ink from said source to said distributing apparatus, and power operated control apparatus comprising a double-acting air motor for controlling operation of said delivery device, said

power operated apparatus being movable between a first position where it prevents said delivery device from delivering ink to said distributing apparatus and a second position where it permits said delivery device to deliver ink to said distributing apparatus; electrical control apparatus including a plurality of solenoid-operated valves for effecting movement of said first mentioned control apparatus by and in accordance with movement of said carriage; and switch apparatus for reversing the position of a selected one of said control apparatuses with respect to the other control apparatus.

9. In a printing press having an ink feed carriage movable to and from printing position and a transfer cylinder for transferring ink to a web: an ink supply source on said carriage; distributing apparatus on said carriage for distributing ink uniformly on said transfer cylinder; a reciprocably movable ductor roll for delivering ink from said source to said distributing apparatus; and electrical apparatus for automatically moving said roll away from said source when said carriage moves from printing position.

10. In a printing press having an ink feed carriage movable to and from printing position and a transfer cylinder for transferring ink to a web: a plurality of feed arrangements on said carriage, each arrangement including an ink supply source, at least one distributing roll for distributing ink uniformly on said transfer cylinder, a ductor roll reciprocably movable independently of said carriage for delivering ink from said source to said distributing roll, and power operated control apparatus for controlling operation of said ductor roll, said power operated apparatus being movable between a first position where it prevents said ductor roll from delivering ink to said distributing roll by moving said ductor roll away from said source and locking it against return thereto, and a second position where it permits said ductor roll to deliver ink to said distributing roll; electrical control apparatus for effecting movement of said first mentioned control apparatus by and in accordance with movement of said carriage; and switch apparatus for reversing the position of a selected one of said control apparatuses with respect to the other control apparatus.

11. In a printing press having an ink feed carriage movable to and from printing position and a transfer cylinder for transferring ink to a web: an ink supply source on said carriage; distributing apparatus on said carriage for distributing ink uniformly on said transfer cylinder; a device movable independently of said carriage

for delivering ink from said source to said distributing apparatus; delivery control apparatus for controlling operation of said delivery device, said control apparatus being movable between a first position where it prevents said delivery device from delivering ink to said distributing apparatus and a second position where it permits said delivery device to deliver ink to said distributing apparatus; a switch automatically moved by and in accordance with movement of the carriage; mechanism whereby movement of said switch effects movement of said delivery control apparatus; and a second switch for reversing the relationship between the position of said delivery control apparatus and the position of the first switch.

12. In a printing press having an ink feed carriage movable to and from printing position and a transfer cylinder for transferring ink to a web: a plurality of feed arrangements on said carriage, each arrangement including an ink supply source, at least one distributing roll for distributing ink uniformly on said transfer cylinder, a device movable independently of said carriage for delivering ink from said source to said distributing apparatus, and power operated delivery control apparatus for controlling operation of said delivery device, said power operated apparatus being movable between a first position where it prevents said delivery device from delivering ink to said distributing apparatus and a second position where it permits said delivery device to deliver ink to said distributing apparatus; electrical apparatus for effecting movement of all of said control apparatus in accordance with movement of said carriage, this electrical apparatus including a single pole double throw switch operated by movement of said carriage and having control circuit connections with each of said delivery control means; and a double pole double throw switch in each of said connections for reversing the position of a selected one of said control apparatuses with respect to the other control apparatus.

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