

[54] **INKING SYSTEM WITH MEANS FOR AUGMENTING TRANSFERRED INK**[75] Inventor: **Claus Simeth**, Offenbach, Germany[73] Assignee: **Roland Offsetmaschinenfabrik Faber & Schleicher AG**[22] Filed: **Aug. 5, 1974**[21] Appl. No.: **494,993**[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** **101/350**[51] **Int. Cl.²** **B41F 31/06; B41F 31/10**[58] **Field of Search** 101/350, 351, 352, 363, 101/364, 148[56] **References Cited****UNITED STATES PATENTS**

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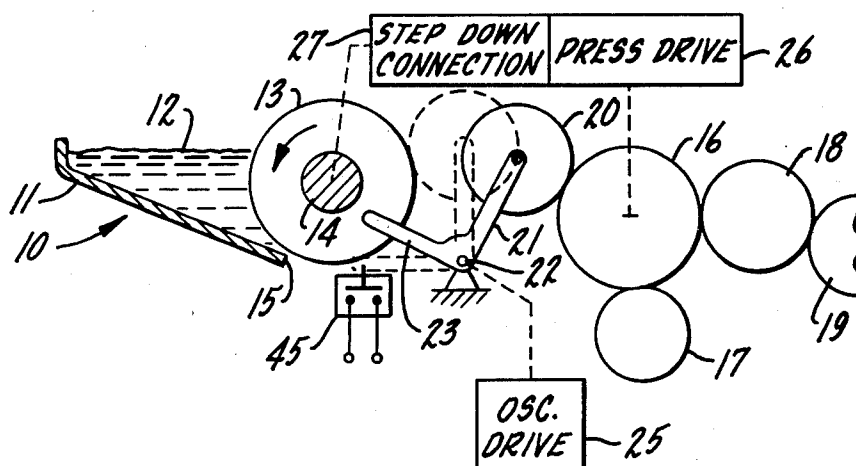
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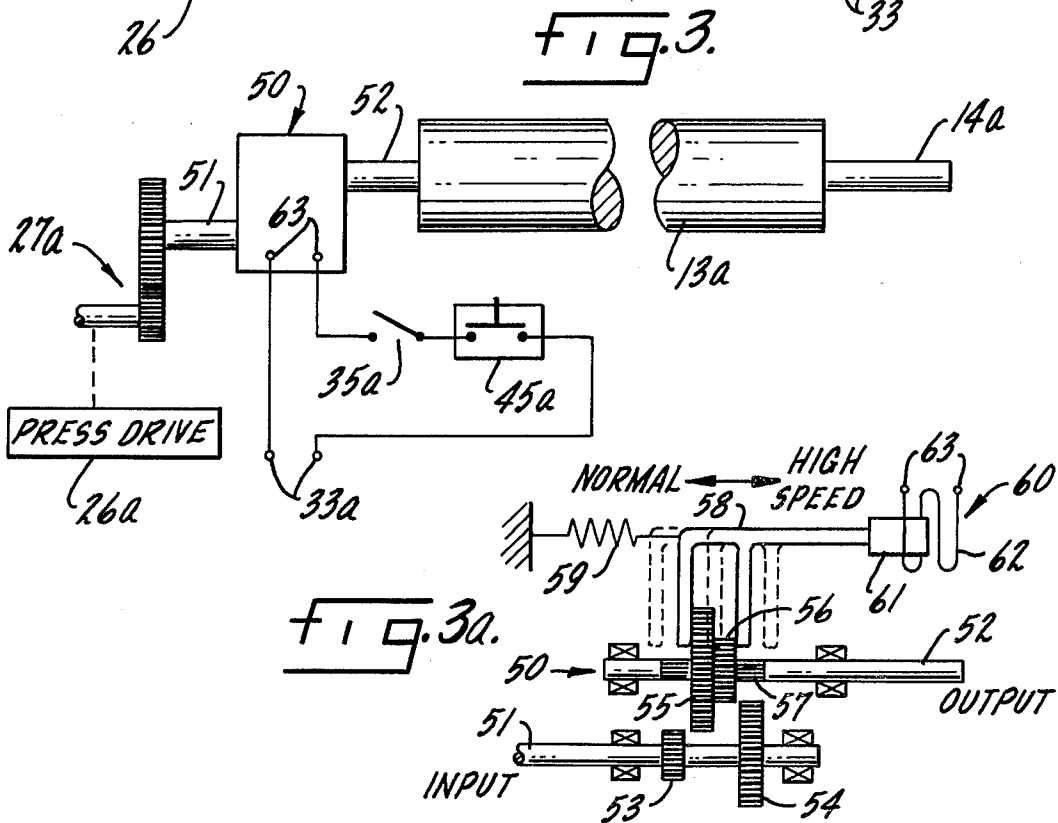
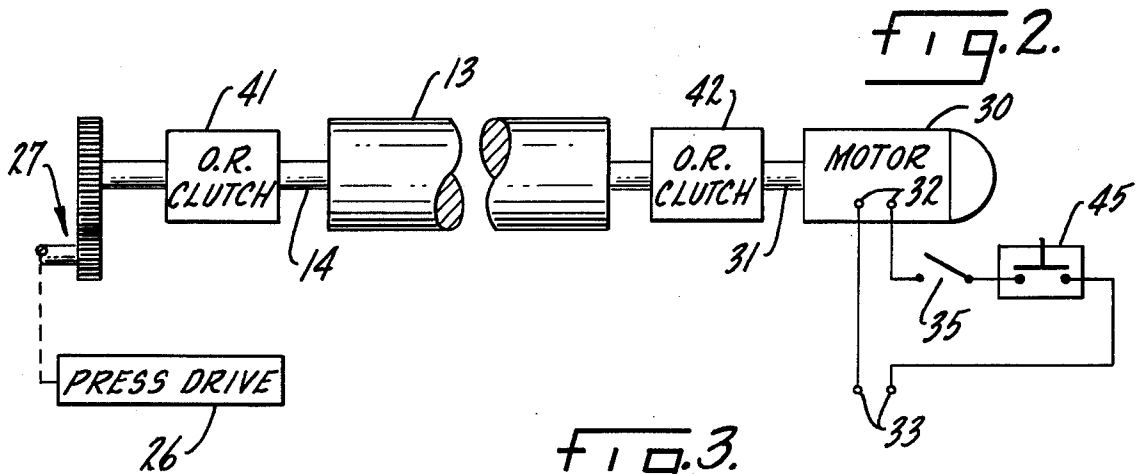
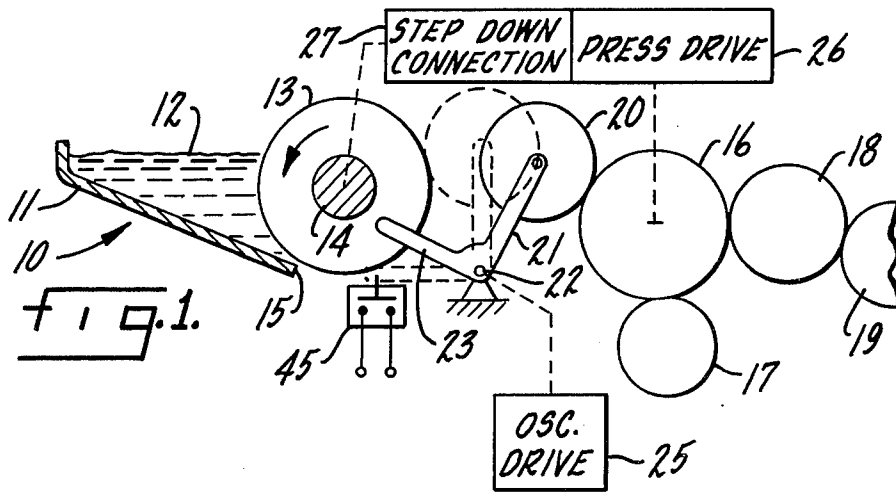
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An ink feed system employing a ductor roller oscillatable between a slowly driven fountain roller and more rapidly driven ink drum for pick-up and transfer of ink respectively in which auxiliary means are provided for temporarily speeding up the rotation of the fountain roller thereby to increase the amount of ink fed during each cycle of the ductor roller so as to increase the flow of ink to the plate cylinder for the making of proof copies during initial adjustment and start-up of the press. In the preferred embodiment the speed-up is obtained by an auxiliary electric motor having a series-connected switch interlocked with the oscillating movement of the ductor roller.

1 Claim, 4 Drawing Figures



INKING SYSTEM WITH MEANS FOR AUGMENTING TRANSFERRED INK

During adjustment and start-up of a printing press the pressman usually finds it desirable to temporarily increase the ink being fed from the ink fountain. Such temporary increase is generally obtained by manual rotation of the fountain roller at a higher than normal speed. In printing presses capable of printing four to six colors, requiring separate manipulation at each fountain, the process is time consuming and the pressman cannot, in any event, augment the ink flow simultaneously at each of the fountains. Moreover, in machines of the satellite type the fountain rollers are poorly accessible and difficult to keep under observation. A particularly difficult problem is presented when printing takes place at high speed and the reaction time of the pressman is not sufficiently fast as to allow him to momentarily increase the speed of the fountain roller at the precise time that the ductor roller is in its pick-up position.

It is, accordingly, an object of the present invention to provide, in a fountain roller drive connection, means for temporarily increasing the driving speed for increasing the rate of ink flow during initial adjustment and start-up. It is another object of the invention to provide means for temporarily increasing the speed of a fountain roller by remote control from a convenient observation post where, in the case of multi-color presses, means may be provided for by bringing about a simultaneous increase in the amount of ink fed in each of the colors.

It is a more detailed object of the present invention to provide means for obtaining temporary increase in the amount of ink supplied by a fountain roller by temporarily increasing the speed thereof, but with the increase in speed being limited to those intervals when the ductor roller is in rolling, pick-up engagement with the fountain roller.

Other objects and advantages of the invention will become apparent upon reading the attached detailed description and upon reference to the drawings in which:

FIG. 1 is a schematic diagram showing an elevation, the rollers typically provided in an inking system and to which the present invention has been applied.

FIG. 2 shows the fountain roller of FIG. 1 with normal driving means and an auxiliary electric driving motor with its associated circuitry and with isolation being provided by overrunning clutches.

FIG. 3 shows a modified form of the invention in which the temporary increase in speed is brought about by a shiftable transmission providing normal and high speed modes.

FIG. 3a is a diagram showing a type of shiftable transmission usable in the arrangement illustrated in FIG. 3.

While the invention has been described in connection with certain preferred embodiments, it will be understood that I do not intend that the invention be limited to such embodiments but I intend, on the contrary, to cover the various alternative and equivalent forms of the invention included within the spirit and scope of the appended claims.

Turning now to the drawings there is disclosed an ink fountain 10 having a trough 11 containing a body of ink 12 in contact with a slowly rotating fountain roller 13 with a shaft 14. The trough 11 has a lip 15 which is

spaced at a predetermined distance with respect to the surface of the roller to produce a film of ink, as the roller rotates in the direction shown, which is relatively thick compared to the thin film which is transferred from form roller to plate cylinder in a conventional press.

Spaced from the fountain roller 13 is an ink drum 16 having associated rollers 17, 18 with the roller 18 serving to feed ink to the next drum 19 and the rest of the rollers in the system, terminating in the form rollers.

Interposed in the space between the fountain roller 13 and ink drum 16 is a ductor roller 20, mounted upon a pair of arms 21 (only one being shown) hinged to the press frame at 22 and having a switch operating arm 23 to which reference will be made. The arm 21 is oscillated back and forth by a conventional oscillating drive 25.

The ink drum 15 is rotated by the press drive 26 at "press speed," that is, at a peripheral speed which corresponds to the peripheral speed of the plate cylinder. The fountain roller 13 is normally rotated at a speed which is only a fraction of press speed by a set of step-down gearing from the press drive. This has been diagrammatically illustrated in FIG. 1 by the block 27 labeled "step-down connection." The oscillating drive 25 which rocks the ductor roller back and forth will normally be powered by the press drive 26. Also, means (not shown) will normally be provided for the purpose of reciprocating, or "vibrating," the ink drum 15 back and forth for lateral distribution of the ink received from the ductor although, in the broader aspects of the present invention, vibration of the drum 15 is not essential.

In accordance with the present invention auxiliary drive means are provided for the fountain roller for temporarily increasing the speed thereof to bring about a temporary increase in the amount of ink transferred to the ink drum during a cycle of ductor movement, the auxiliary drive being remotely actuatable by the press operator from a control station to facilitate the making of proof copies during initial adjustment and start-up of the press. Thus referring to FIG. 2 and electric motor 30 having a shaft 31 is mechanically coupled to the shaft of the fountain roller 13. The electric motor is energized by terminals 32 connected to a voltage source 33 and having a remotely located manual control switch 35. The electric motor may be either of the AC or DC type, preferably with built-in speed reduction for turning the output shaft 31 at a predetermined speed which is, nonetheless, substantially higher than the normal speed of rotation of the fountain roller, for example, two to three times as great.

In carrying out the invention the fountain roller is coupled to the alternative sources of driving energy by one-way drive connections in the form of a first overrunning clutch 41 interposed in drive shaft 14 and a second overrunning clutch 42 interposed in the drive shaft 31. It will be understood that the overrunning clutches are per se entirely conventional and they may, for example, be of the type employing a coil spring having light encircling engagement with a shaft or pulley, and with the spring tightening to transmit torque in one direction of relative rotation and loosening, for idle slippage, in the opposite direction of relative rotation.

Thus, in operation, with the motor 30 stationary the shaft 14 is driven by clutch 41, with idle slippage taking place in clutch 42. However, when the motor 30 is en-

energized driving the shaft 31 at higher than normal fountain roller speed, clutch 42 tightens to provide a positive high-speed driving connection, while idle slippage takes place at clutch 41. Thus the clutches 41, 42 perform a selective isolating function, the higher speed taking over control, and preventing any direct connection or interaction between the two power sources.

In accordance with a further aspect of the present invention means may be provided in the control circuit for the motor so that the motor is energized for temporary high speed driving only during that time that the ductor roller 20 is in its pick-up position in engagement with the surface of the fountain roller, being deenergized at all other times. This is accomplished by a normally open interlock switch 45 which is arranged in the path of movement of the arm 23 which is rigidly connected to the arm 21 upon which the ductor roller 20 is carried. Thus switch 45 is closed, completing a circuit to the motor, when the ductor roller occupies the position shown dotted in FIG. 1. The use of such interlock switch makes it unnecessary for the press operator to time the interval of speed-up to coincide with the pick-up phase of the ductor. The operator, then, may simply close the manual control switch 35 with assurance that closure of the interlock 45 in series therewith will produce automatic timing of the high speed drive connection.

While the installation illustrated in FIGS. 1 and 2 has to do with only a single ink feeding arrangement, it will be understood that the invention is particularly applicable to multi-color presses in which individual press units are arranged in satellite fashion about a common impression cylinder. In presses of this type the construction is so compact that it is difficult for the operator to manually advance the various fountain rollers, and it is difficult, indeed, to observe when the ductors associated with the respective fountain rollers are in the pick-up phase. By the present remote control speed-up arrangement, all of the control switches 35 associated with the respective motors 30 may be conveniently controlled, and simultaneously energized, if desired, (by coupling the switches mechanically together) at the same control station. As a result, the necessary proof copies may be obtained more reliably and in a fraction of the time previously required.

For simplicity, the motor 30 in the above embodiment of the invention has been assumed to be a motor of single operating speed which permits simplified control, or switching, circuitry and which suffices for most applications. However, it will be understood that the invention contemplates use of a motor having more than one speed, indeed, two or more speeds, controlled by a speed selector switch at the operating station. This has not been illustrated since multi-speed motors, having whatever selectable speeds may be desired, are a readily available catalog item.

ALTERNATE EMBODIMENT

While an electric motor constitutes a convenient auxiliary drive means, it will be appreciated by one skilled in the art that the invention is not limited to use of an electric motor, and includes use of a remotely shiftable transmission interposed in the connection between the press drive and the main fountain roller drive shaft. Thus, referring to FIGS. 3 and 3a, where corresponding reference numerals have been employed with addition of subscript *a*, the press drive 26a feeds a drive connec-

tion 27a for driving a fountain roller 13a having a shaft 14a. Interposed between the drive connection 27a and the shaft 14a is a transmission 50 having an input shaft 51 and an output shaft 52. While the transmission 50 may take various forms, the form illustrated in FIG. 3a will suffice to illustrate the principle involved. In this transmission the input shaft has a slow speed drive gear 53 and high speed drive gear 54. The latter are selectively engageable by driven gears 55, 56 on the output shaft. To provide the selective engagement, the gears 55, 56 have a slidable spline connection 57, with positioning by a yoke 58. The latter, shown in neutral, is urged into normal position by a return spring 59. To shift the yoke to the high speed mode a solenoid 60 is provided having a plunger 61 and coil 62 having electrical connections 63. The solenoid is energized by a power source 34a under the control of a manual switch 35a and interlock switch 45a.

The operation, then, is equivalent to that discussed in FIG. 2. Normally, and without operator intervention, the transmission 50 will operate in its normal mode to rotate the fountain roller 13a at the regular, slow operating speed. However, when the operator at the control station closes the switch 35a a circuit is set up for the interlock switch 36a so that when the ductor 20 is in its pick-up position the solenoid 60 will be energized shifting the transmission 50 into its temporary high speed mode in which ink is transferred to the ductor roller at a greater rate as desired during the initial adjustment and start-up. While the two embodiments suffice to show the generic nature of the invention, one skilled in the art will appreciate that there are still other equivalents which may be used, for example, differential gearing in which the regular input and output are connected as at 51, 52, and with the third, or "differential" connection being coupled to an electric motor having irreversible gearing (or an automatic brake) to hold the third connection stationary when the motor is deenergized, but otherwise having the same control circuit as disclosed in FIG. 2.

Although it has been emphasized that the present invention permits the speed of the fountain roller, or rollers, to be enhanced conveniently from a remote control station, it will be understood that the term "remote" is a relative one not limited to any specific amount of separation and has to do with the fact that the press operator is no longer required to reach in and manually rotate an ink fountain at a high temporary rate of speed. The present arrangement has the added advantage that the high speed mode takes place at a mechanically controlled rate (depending upon motor speed and transmission ratio) so that operation is less dependent upon the skill and judgment of the press operator. Indeed, where interlock switches 45, 45a are used the operator is freed from the problem of synchronizing the high speed mode with the pick-up interval of the ductor roller.

What I claim is:

1. In a printing press, the combination comprising an ink fountain having a fountain roller with means for depositing a relatively thick film of ink thereon, an ink drum spaced from the fountain roller, a ductor roller interposed between the fountain roller and the ink drum, means for oscillating the ductor roller between a pick-up position in which the ductor roller is in rolling engagement with the fountain roller and a transfer position in which the ductor roller is in rolling engagement

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with the ink drum, means including a press drive for driving the ink drum at press speed, means including a step-down driving connection for normally driving the fountain roller at an operating speed which is substantially slower than press speed, auxiliary drive means coupled to the fountain roller for temporarily increasing the speed thereof to bring about a temporary increase in the amount of ink transferred to the ink drum during a cycle of ductor movement, and control means temporarily actuatable by the press operator for energizing the auxiliary drive means thereby to increase rate of ink feed to facilitate the making of proof copies

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during initial adjustment and start-up of the press, the control means including an interlock switch effectively connected in series therewith and having an operating connection to the ductor roller so that the increase in speed of the fountain roller is limited substantially to that interval in which the ductor roller is in rolling engagement with the fountain roller, the fountain rather being continuously driven and the control means for temporarily energizing the auxiliary driving motor being independent of press speed.

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