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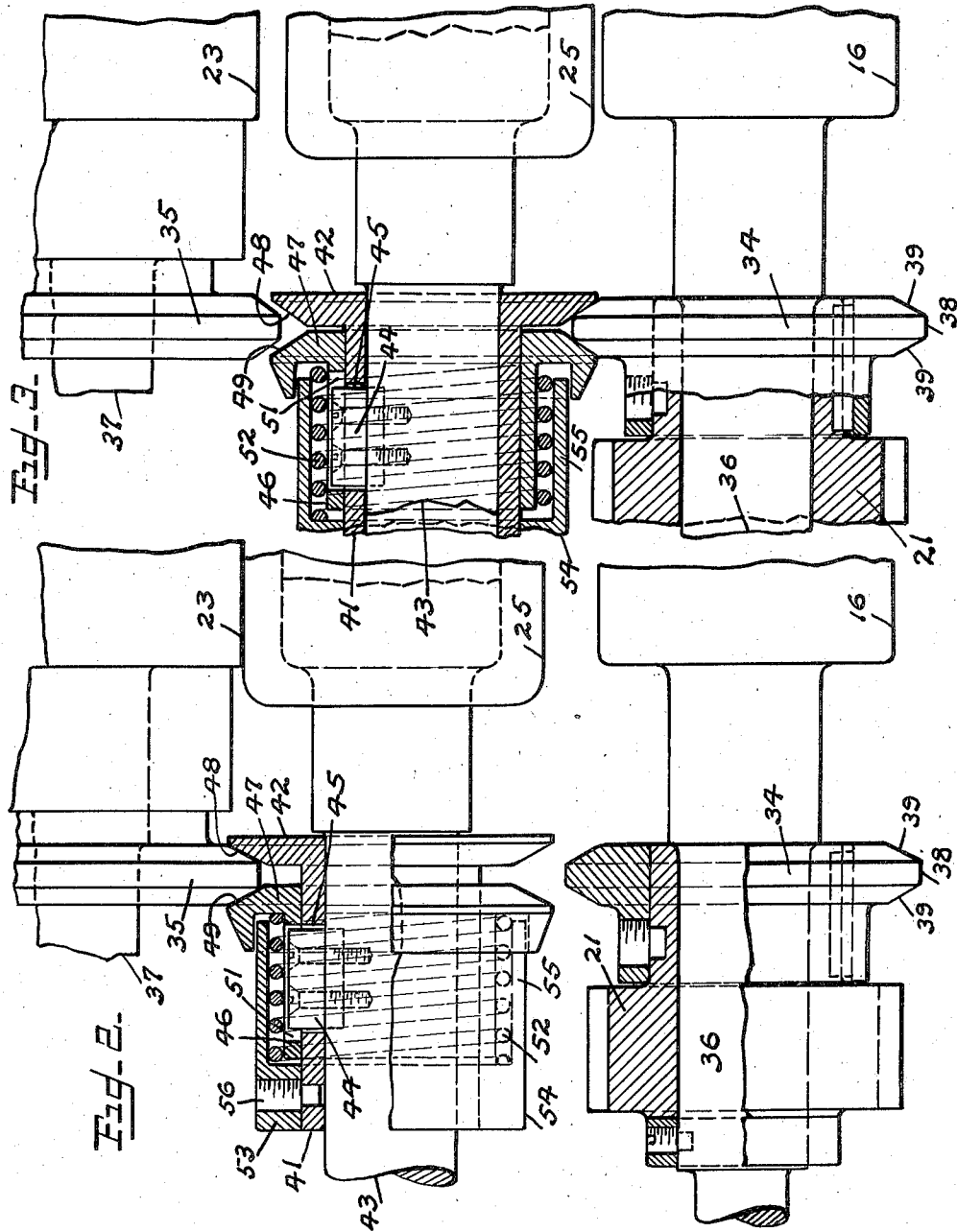
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INKING MECHANISM FOR PRINTING MACHINES

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INKING MECHANISM FOR PRINTING
MACHINES

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This invention relates to improvements in printing machines, and more particularly to inking mechanisms for printing machines of the type wherein ink distributing rollers are provided in contact with the form cylinder of the machine to feed ink thereto.

This invention contemplates general improvements in machine operation and in more even and smooth ink distribution on the form cylinder of the machine by providing improved means to transfer the ink from the supply to the distributing rolls. In such types of mechanism it is usual to provide, a container for the supply of ink, a cylindrical fountain roller, which is intermittently rotated in the container in contact with the ink therein, a series of ink distributing rollers, and a roller in contact with the form cylinder and which is contacted by one or more of the distributing rolls. A transfer or ductor roll is disposed between the series of distributing rollers and the fountain roll and arranged to intermittently contact the fountain roller and then contact one of the distributing rollers to carry a limited supply of ink from the former to the latter. Both the fountain roller and the distributing roller contacted by the ductor roll are power driven, the former for intermittent rotation at slow speed and the latter for continuous rotation at press or machine speed.

Alternately and abruptly contacting a slowly rotated roller and a comparatively rapidly rotating roller by the transfer or ductor roll, results in many instances, in uneven distribution of ink upon the form cylinder, irregular and inefficient operation of the inking mechanism and undue wear upon the rolls and bearings thereof, due, primarily, to the constant series of shocks imposed upon the mechanism whenever the transfer roll rotating at the speed of the last contacted roller comes into abrupt contact with the other roller which is substantially stationary or is being rotated at a different speed. Under such conditions, it has been found that, in many instances, the ink obtained from the fountain roller by the ductor roller in the form of a ribbon like layer is of varying thickness, whereas for best results it should be of uniform thickness and of even width, the length of the roll.

The principal object of this invention is to provide improved inking mechanism whereby the above mentioned disadvantages are obviated, shocks and strains due to alternate contact of one roll with others are entirely eliminated, or, at least, are reduced to a minimum in degree, where-

by increased efficiency in ink distribution is obtained.

Another object is to provide, in inking mechanism, improved means to transfer ink from a fountain roller to a distributing roller whereby even and smooth distribution of ink is obtained.

A further object is to provide, in inking mechanism, improved means to insure change in speed of the transfer roll to substantially that of the roll about to be contacted, before such contact takes place.

A still further object is to provide improved inking mechanism which is of comparatively simple construction, inexpensive to manufacture and efficient in use, for a printing machine whereby the efficiency of operation of the machine as a whole is substantially increased and the printed matter obtained therefrom is more uniform and of better quality.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Figure 1 is a more or less schematic view of a portion of a printing machine embodying the features of this invention and more particularly the arrangement of an inking mechanism to which this invention applies;

Figure 2 is a view showing portions of rolls of the inking mechanism illustrated in Figure 1 and showing cooperating structure between the rolls which embodies features of the invention;

Figure 3 is a view similar to Figure 2 but showing the parts in another position of operation;

Figure 4 is a view of the driving end of one of a series of ink distributing rolls and shows an arrangement whereby the roll may be permitted longitudinal reciprocating movement; and

Figure 5 is an end view of the parts shown in Figure 4 looking in the direction of arrow 5 of Figure 4.

The printing machine selected to illustrate the features of this invention is one wherein the form or plate cylinder (not shown in the drawings) is contacted by certain of a series of distributing rolls 10 which are in contact with an ink drum 11. The ink drum 11, as well as rotating, may also be reciprocated lengthwise along the form cylinder by any suitable means, a portion of which is indicated at 12. The ink drum 11 is journaled in the machine frames, one of which is indicated at 13. A series of ink distributing rollers 14, 15, and 16 are arranged about ink drum 11 to insure a smooth and uniform spread of ink over its peripheral surface. One of the rollers, in this instance, 16, in-

initially receives the ink from a supply and through intermediate rollers 15 transfers and distributes it to rollers 14 which in turn transfer and distribute it to the ink drum 11. Roller 16 may be given a reciprocating movement lengthwise if desired and in Figure 1 a portion of means for so doing is indicated at 17. Roller 16 is preferably rotated at press speed and gears 18 and 19 may be provided for this purpose, it being understood that gear 18 is driven by a main press driving member and that gear 19 meshes with a cooperating pinion 21 on the shaft of roller 16.

An ink container or fountain 22 is disposed between the frame members 13. An ink fountain roller 23 is journaled to be rotated in the ink fountain 22 and be sufficiently immersed in the ink therein to become covered with the same upon being rotated. Mechanism, (not shown) but generally understood, intermittently drives roller 23 in synchronism with the press, for instance, a pawl and ratchet drive for the fountain roller may be provided, whereby a portion of a revolution will be given roller 23 at predetermined intervals in the operation of the press.

A ductor or transfer roller 25, preferably being freely rotatable, is shown mounted upon an arm 26 of a rocking lever 27. Roller 25 is adapted to be oscillated about the pivot shaft 28 to alternately contact with the fountain roller 22 and the distributing roller 16. This oscillating movement of roller 25 may be controlled by a cam member 29 driven by gear 31, which rotates in unison with gear 18, through an arm 32 of the lever 27, whereby the roller 25 will be oscillated in synchronism with the press movements.

From the above it will be understood that distributing roller 16 is rotated at a relatively high speed and that fountain roller 23 is rotated intermittently at a relatively slow speed and at intervals being at rest. It will also be understood that should the ductor or transfer roller 25 be directly moved into contact with either of the rollers 16 or 23 it will immediately tend to be rotated thereby causing a momentary shock upon the mechanism at the instant of contact. In other words, such action will tend to cause a drag upon roller 16 until the roller 25 runs at the same rotating speed as the roller 16 and also tend to accelerate roller 23 until the roller 25 is slowed down or stopped thereby. This action on the part of roller 25 would tend to unevenly distribute ink to roller 16 in one case and to unevenly receive ink from roller 23 in the other, as well as cause a strain to be imposed upon the entire mechanism, causing in many instances undue wear and uneven operation.

The above described action of roller 25 has been substantially eliminated by the provision of improved means to rotate the roller 25 at substantially the same speed as the roller it is about to engage and before such engagement or contact takes place. The means suitable for this purpose is illustrated more clearly in Figures 2 and 3 and includes the provision of pulley members 34 and 35 suitably arranged to rotate in unison with rollers 16 and 23 respectively for instance by being secured to the respective shafts 36 and 37 thereof. Each of the pulley members 34 and 35 are provided with peripheral edges 38 substantially inverted V shaped in cross section, providing a beveled friction surface 39 on each side of the member at its periphery. The diameter of the members 34 and 35 in each instance is preferably somewhat greater than the

diameter of the respective rollers 16 and 23 to which it is secured.

In instances where the roller 16 is reciprocated axially it is proposed to provide structure as shown in Figures 4 and 5 whereby axial movement is permitted between shaft 61 of roller 16 and the pulley member 34. As illustrated, the shaft 61 is provided with an elongated keyway 62 in which key 63, rotatably securing roller 34 thereto against rotation relatively to the shaft 61 while permitting sliding movement thereon, is disposed. Gear 64 corresponding to gear 21 is provided with suitable journal mechanism such as roller bearing 65 supported in a bracket 66. The bracket 66 is adapted to be secured to the machine frame or other stationary part by securing means passing through openings 67 formed in a part thereof. The roller 16 by the above arrangement may be axially reciprocated without interfering with the axial disposition of pulley member 34.

Suitable means, drivingly connected to roller 25, is disposed in position to cooperate with members 34 and 35 by engagement therewith and to be driven thereby, before roller 25 engages either roller 16 or 23. This means may comprise a sleeve member 41 having a radially extending annular flange 42 at one end and being secured against rotation thereon to a shaft 43 of roller 25 by means of a key 44 disposed in an opening 45 in sleeve 41. Sleeve 41 is slidably mounted upon shaft 43, being permitted limited axial movement thereon by forming the key opening 45 slightly longer than key 44. Another sleeve member 46 is slidably mounted upon sleeve 41 and is provided with a radially directed annular flange portion 47 upon the end thereof adjacent flange 42. The flanges 42 and 47 are each provided with bevelled surfaces 48 and 49 at their respective peripheries which coincide to form a groove therebetween that is substantially V shaped in cross section.

The sleeve 46 is connected to shaft 43 against rotation relatively thereto and to the sleeve 41 by key 44 extending through sleeve 41 and disposed in an opening 51 formed in sleeve 46. The opening 51 is elongated to permit relative axial movement between the sleeves 41 and 46 and between sleeve 46 and shaft 43. A coiled compression spring 52 is provided to urge the sleeves 41 and 46 axially with respect to each other to tend to maintain the flanges 42 and 47 and therefore the bevelled surfaces 48 and 49 in coinciding relation to form the aforesaid V shaped groove. The combined structure comprising the cooperating flanges 42 and 47 with the resilient means, or spring 52 form what may be termed a spring friction pulley. The spring 52 acts between sleeves 41 and 46 by engaging flange 47 of sleeve 46 at one end and the bottom part 53 of a cup shaped member 54 at the other end, the members 54 being secured to sleeve 41, for instance by part 56. The sides 55 of the member 54 extend axially along sleeve 46 and overlie spring 52 to cover the same. The bottom part 53 against which the spring acts and sides 55 with spring 52 form a serviceable spring retaining means.

When roller 25 is oscillated to alternately contact with rollers 16 and 23 and before such contact, the pulley members 34 and 35 respectively engage the spring friction pulley formed by flanges 42 and 47. In so doing, roller 25 is rotated more rapidly, its rotation is slowed down, or is stopped entirely, as the case may be, before it contacts with the respective roller 16 or 23. This

action is cushioned to a certain extent due to the gradually increasing pressure of flanges 42 and 47 against the respective members 34 and 35 as they are brought into contact therewith to spread the flanges apart against the action of spring 52. Figure 2 shows the member 35 fully engaged with flanges 42 and 47 and spring 52 compressed causing tight frictional engagement between the contacting parts. During this interval, roller 25 contacts roller 23 applying ink to its surface during its rotation in synchronism therewith. Figure 3 illustrates the position of the parts as roller 25 approaches roller 16, the flanges 42 and 47 being contacted by member 34 and the rotation, if any, of roller 25 being slowed down or stopped by the braking action thus imposed.

By the provision of the above described mechanism more efficient machine operation and more even distribution of ink upon the form cylinder is obtained and without imposing unnecessary and undue shocks and strains upon the machine parts adjacent thereto or in connection therewith. The mechanism is comparatively simple in structure, inexpensive to manufacture and particularly efficient in operation.

It will be understood that in addition to use in connection with inking mechanism, the mechanism herein disclosed may also be employed in connection with moistening mechanism used on planographic printing machines.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the claims rather than to the foregoing description to indicate the scope of the invention.

What I claim is:

1. In combination with a pair of driven rollers, one being driven at a speed faster than the other, a freely rotatable roller swingable into contact with the others, a pulley-like member, substantially inverted V shaped in cross section at its periphery, secured to each of the driven rollers, and a pair of separable members coinciding to form a substantially V shaped groove therebetween and secured to the freely rotatable roller, said members and said pulley-like member being engageable with the inverted V shaped portion of one in between and separating the members forming the V shaped groove of the other.

2. In combination with a pair of driven rollers, one being driven at a speed faster than the other, a freely rotatable roller swingable into contact with the others, a pulley-like member substantially inverted V shaped in cross section at its periphery secured to each of the driven rollers, and a pair of separable members coinciding to

form a substantially V shaped groove therebetween and secured to the freely rotatable roller, said members and said pulley-like member being engageable with the inverted V shaped portion of one between and separating the members forming the V shaped groove of the other, and means to urge each of said pair of members toward each other.

3. In combination with a pair of rollers, one being swingable into contact with the other and one being rotatably driven and the other freely rotatable, means to drive the freely rotatable roller in unison with the driven roller including means presenting an axially expandible groove having movable side portions, and spring means to urge said side portions together.

4. In combination with a pair of rollers, one being swingable into contact with the other and one being rotatably driven and the other freely rotatable, means to drive the freely rotatable roller in unison with the driven roller including expandible means having axially movable side portions, and spring means to resist axial movement of said side portions.

5. In a printing machine, a driven fountain roller, a driven inking roller, a freely rotatable ductor roller mounted for swinging movement into and out of engagement alternately with said fountain and inking rollers, and means to drive connect said ductor roller to the roller toward which it is swung before it engages the same, including a friction driving member rotating with each said fountain and inking rollers, and an expansible friction member rotatable with the ductor roller having spring controlled opposing movable members adapted to engage with increasing friction said friction driving members while said ductor roller is being swung toward said fountain and inking rollers.

6. In an inking mechanism, a freely movable first roller adapted to be oscillated into contact with and being disposed between, a relatively fast moving second roller and a relatively slow moving third roller, means to drive connect said first roller with said second and third rollers before it contacts with either roller including a part connected to each of said second and third rollers, each of said parts having an inverted V shaped edge, relatively slidable parts adapted to form a groove therebetween and being connected to said first roller, and resilient means arranged to constantly urge said relatively slidable parts on the first roller together, to cause them to engagingly embrace the inverted V shaped edges on the second and third rollers with gradually increasing and substantially equal pressure on both sides of the inverted V shaped edges, as the first roller approaches a contacting position with either of said second or third rollers.

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