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F. NEAL

3,046,885

PRINTING MACHINE INK RAIL

Filed May 12, 1960

FIG. 1.

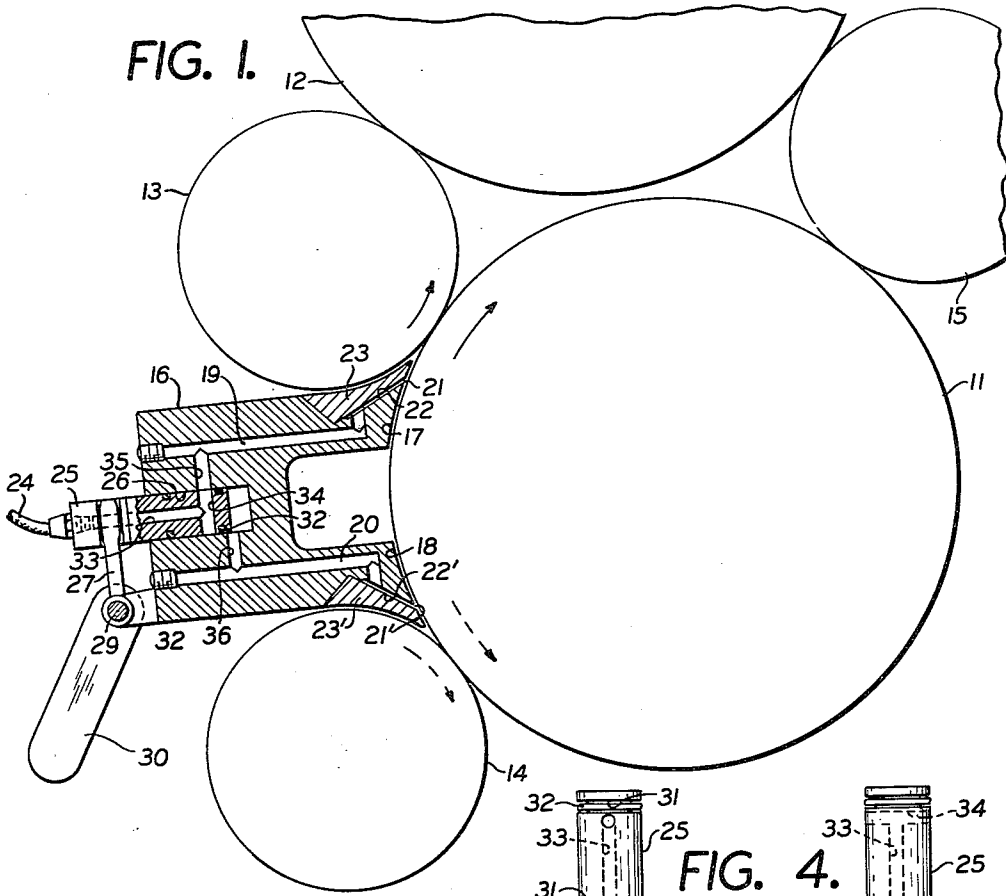


FIG. 3.

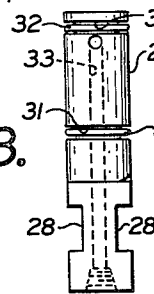


FIG. 4.

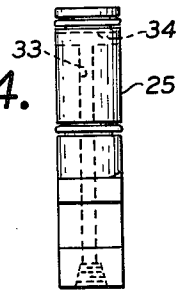
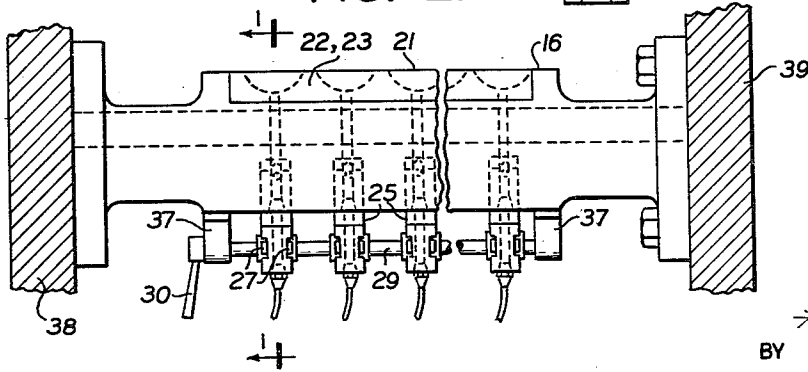


FIG. 2.



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PRINTING MACHINE INK RAIL

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 13 Claims. (Cl. 101—350)

This invention relates to the inking mechanisms of printing machines and more particularly to the ink rails thereof.

In known inking mechanisms, ink is pumped through an ink rail to the initial drum of a series of such drums, some of which may have an axially reciprocating movement and which cooperate to work the ink into a suitably uniform film and then transfer it by means of form rollers to the printing or plate cylinder. In these devices, the ink rails are conventionally arranged with respect to the distributing drums with which they cooperate so that orifices or slots in the face of the rail through which the printing ink is forced onto the drum are centrally located and the face of the rail extends a considerable distance following the curve of the distributing drum on each side of the orifices.

An advantage of such an arrangement is that the distributing drum may rotate in either direction, but ink spraying or misting is difficult to avoid because it is practically impossible to locate the first ink roller, which spreads the freshly applied ink over the surface of the first distributing drum, close enough to the rail. Also, such an ink rail cannot be set correctly for both directions of rotation where the printing couple is reversible.

It is the general object of the present invention to provide an improved ink rail by means of which the printing ink is supplied to the surface of the first distributing drum immediately before the contact line between this drum and a rubber roller cooperating therewith.

Another object of the invention is to provide an ink rail arrangement having substantially the same distribution in both directions of rotation of the mechanism.

A further object is to provide an ink rail of the type indicated having conveniently operable means for shifting over of ink from one side of the rail to the other, when the printing couple is reversed.

An inking mechanism embodying the invention in a preferred form will now first be described with reference to the accompanying drawing, and the features forming the invention will then be pointed out in the appended claims.

In the drawing:

FIG. 1 is a section taken on the line 1—1 of FIG. 2 through the ink rail and showing schematically adjacent drums and rollers cooperating therewith;

FIG. 2 is a plan view of the ink rail;

FIG. 3 is an enlarged plan view of a piston valve forming part of the mechanism; and

FIG. 4 is a side view of the piston valve shown in FIG. 3

As shown in FIG. 1, the mechanism of the invention comprises ink distributing drums 11 and 12, which are typically steel or other hard surfaced drums, a plurality of ink transfer rollers 13, 14, 15 which are typically rubber covered or other soft surfaced rollers, together with an ink rail 16 from which the ink is supplied. As will be understood, further drums and rollers taking ink from the drum 12 may and ordinarily will be provided, as for example, in the ink motions shown in prior patents to Ginsberg, 1,962,011 and to Harless 2,699,116. The ink rail

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16 is designed to furnish ink in one direction of rotation (corresponding to the solid arrows applied to drums 11 and 13) and also in the opposite direction of rotation (corresponding to the broken arrows applied to drums 11 and 14). It will be understood that when the direction of rotation is changed, all the drums shown reverse their rotation. The ink drum structure is arranged so as to supply ink closely adjacent a line of engagement between elements 11 and 13 in the one direction of rotation and also to supply ink closely adjacent the line of engagement between elements 11 and 14 when the drums are rotated in the opposite direction.

The ink rail structure providing for this operation is shown in FIGS. 1 and 2. As there shown, the ink rail body 16 has spaced faces 17 and 18 curved so as to conform generally to the drum 11 and rearwardly of these faces has ink ducts 19 and 20, terminating respectively in the ink supplying orifices 21 and 21'. These orifices are conveniently formed by milling shallow pockets 22 and 22' in the body of the ink rail and covering them by inserts 23 and 23' suitably shaped to conform to the curvature of the adjacent drum and rollers as shown. The ink is supplied through conduits 24 from the usual ink pump such as shown, for example, in prior patent to Schmidt 1,348,900 or White 1,311,198 and through piston valves 25 which are reciprocable in bores 26 for connecting the conduits 24 selectively to either the bores 19 or the bores 20 as desired. The piston valves are operable by means of forks 27 engaging in recesses 28 in the piston bodies, these forks being mounted on a common shaft 29 which may be rocked by means of a hand lever 30 and which is rotatably mounted in bearing blocks 37 secured to the ink rail body. As will be apparent, turning the handle 30 from one position connects the conduits 24 to the bores 19 while turning it to another connects them to the bores 20. The ink rail is supported by securing body 16 to members 38, 39, holding it in the desired position with reference to the drum and rollers.

The piston valve itself is of simple construction, having circumferential grooves 31 carrying sealing rings 32 which seal to the wall of the bore 26, and each piston has a center bore 33 and cross bore 34 for establishing connection either to the ports 35 leading to the bores 19 or to the ports 36 leading to the bores 20. Conduits 24 may be made of plastic or even metallic material and will possess sufficient flexibility to permit the required piston valve movement.

With the piston valves set in their outer position as shown in FIG. 1, the ink is supplied through bores 19 and orifices 21 closely adjacent the nip or line of engagement of drum 11 and roller 13 so that immediately after its being placed upon the drum 11, it is worked between this drum and soft surfaced roller 13 and is partly transferred by the latter to the second distributing drum 12.

Further working and transfer of ink occurs at the nip of roller 15 and drum 11 and some further working is given the remaining ink by roller 14.

In the reverse direction of operation, the ink is applied by the orifices 21' to the drum 11 immediately adjacent the nip of this drum and roller 14 and is smoothed out and worked by this roller and further worked and transferred by rollers 15 and 13.

The faces 17 and 18 are preferably spaced close to the drum 11 (a spacing of the order of .004-.006 inch being appropriate) and the upper and lower faces of the rail adjacent the rollers 13 and 14 are spaced close to these elements and conform to the curvature thereof, although

the spacing may be somewhat larger, allowing for a very small variation in diameter which may occur in a properly ground soft surfaced roller. It will be noted that the tip of either rail edge is jammed close into the nip of the drum and cooperating roller forming a small space which is cuspidal in cross section, so that spattering of ink back of the nip of the rollers is prevented. At the same time, both the drum 11 and roller 13 are in wiping relation to the concave arcuately conforming surfaces of the rail so that any globules are automatically smoothed out. The arcuate surface of the roller face 17 or 18 extends as shown into the cusp formed by the roller and drum combination 13, 11 or 14, 11 and about as close to the nip as is practical. The space from the orifices 21, 21' to the edge of surface 17 or 18 adjacent the nip is, however, of substantial arcuate width as compared with the small, cuspidal space defined by the ink rail and adjacent drum and roller, being equal to the dimension of this cuspidal space as measured around a drum or roller and comparable to the spacing between orifices along the rail (FIG. 2), which permits smoothing out of the ink both circumferentially and lengthwise of the ink drum. As is apparent from FIG. 1, the arc subtended by this portion of surface 17 or 18 beyond the orifice 21 or 21' is a multiple of the arc subtended by the orifices themselves, insuring smoothing out of the ink before it reaches the adjacent nip of roller and cylinder. Travel of ink backward between the drum and roller and these arcuate surfaces is prevented by reason of the movement of the cylinder and roller preventing flow in a direction opposite to such movement, so that no leakage of ink out of the cuspidal space can occur.

If in the forward direction of movement, any unusually heavy ink deposit or globules should remain, or there should be a slight accumulation of ink beyond the nip of rollers 11 and 14, such ink is merely taken up by the roller 14 in its normal distributing operation until the cuspidal space adjacent this roller is again cleared, so that build up and leakage of ink does not occur.

The reverse operation is similar to the forward operation in all important respects. It will be observed that in this direction of rotation, there is about 180° of arc on drum 11 between roller 14 and roller 15. However, tendency to throw ink due to centrifugal force is not objectionable at this point, as normally the reverse rotation applies to color printing and the quantity of ink applied is relatively very small.

What is claimed is:

1. An inking mechanism comprising a hard surfaced ink drum and cooperating soft surfaced roller, an ink rail having arcuate surfaces in cooperative relation to said drum and roller and defining therewith a small cuspidal ink holding space adjacent the nip of the drum and roller, the said rail having a line of orifices in its face adjacent the drum positioned close to the said nip and the said ink rail surfaces being in wiping relation to both drum and roller for smoothing out any globules thereon, a further hard surfaced ink drum and a soft surfaced roller transferring ink from the first said drum to the second said drum.

2. Inking mechanism according to claim 1, in which the first mentioned soft surfaced roller is also in ink transferring relation to the second said hard surfaced drum.

3. An inking mechanism comprising a hard surfaced ink drum and cooperating soft surfaced roller, and an ink rail having arcuate surfaces in cooperative relation to said drum and roller and defining therewith a small cuspidal ink holding space adjacent the nip of the drum and roller, the said rail having a line of orifices in its face adjacent the drum positioned close to the said nip and the said ink rail surfaces being in wiping relation to both drum and roller for smoothing out any globules thereon.

4. Inking mechanism according to claim 3, in which the surface of the rail adjacent the said drum and beyond the ink orifices in the direction of the nip of the said drum and roller subtends a multiple of the arc subtended by the orifices, whereby ink applied by the orifices is

smoothed onto the drum by the ink rail prior to reaching the nip of the said drum and roller.

5. Inking mechanism according to claim 4, in which the said surface beyond the orifices is comparable to the spacing between orifices along the rail, whereby travel of the ink lengthwise of the rail after emerging from the orifices is substantially prevented.

6. Inking mechanism according to claim 3, in which the surface of the said rail adjacent the ink drum and beyond the said line of orifices in the direction toward the nip of the ink drum and roller is of substantial arcuate width as compared with the said cuspidal space and with the spacing along the rail of the orifices, whereby the ink is spread onto the cylinder prior to reaching the said cuspidal space and longitudinal flow of ink between orifices is substantially prevented.

7. An inking mechanism comprising a hard surfaced ink drum and pair of cooperating soft surfaced rollers, an ink rail having arcuate surfaces in cooperative relation to said drum and rollers and defining therewith small, oppositely extending cuspidal ink holding spaces adjacent the nips of the drum and rollers, the said rail having a line of orifices in its face adjacent the drum positioned close to the nip of one of said rollers and the drum and a second line of orifices in its face adjacent the drum and positioned close to the nip of the other said roller and the said drum, and ink supply means for selectively supplying ink to the first said line of orifices or to the second said line of orifices.

8. An inking mechanism according to claim 7, in which the said ink supply means comprises conduits leading to the two said lines of orifices, a valve for each said conduit for directing ink selectively to an orifice of either line and a supply connection to the said valve.

9. An inking mechanism according to claim 8, comprising a common operating mechanism and operating connections therefrom to each said valve.

10. An inking mechanism comprising a hard surfaced ink drum and pair of cooperating soft surfaced rollers, an ink rail having arcuate surfaces in cooperative relation to said drum and rollers and defining therewith small, oppositely facing cuspidal ink holding spaces adjacent the nips of the drum and rollers, the said rail having a line of orifices in its face adjacent the drum positioned close to the nip of one of said rollers and the drum and a second line of orifices in its face adjacent the drum and positioned close to the nip of the other said roller and the said drum, the ink rail surfaces being in wiping relation to the drum and both said rollers for smoothing out any globules thereon.

11. An inking mechanism according to claim 10, in which the said rail has a recess between and separating the said arcuate surfaces.

12. An inking mechanism comprising a hard surfaced ink drum and pair of cooperating soft surfaced rollers, an ink rail having arcuate surfaces in cooperative relation to said drum and rollers and defining therewith small, oppositely facing cuspidal ink holding spaces adjacent the nips of the drum and rollers, the said rail having a line of orifices in its face adjacent the drum positioned close to the nip of one of said rollers and the drum and a second line of orifices in its face adjacent the drum and positioned close to the nip of the other said roller and the said drum, the ink rail surfaces being in wiping relation to the drum and both said rollers for smoothing out any globules thereon and the said arcuate surfaces extending from the said lines of orifices toward the nips of the drum and rollers through a substantial arc whereby ink from the said orifices is smoothed out and spread onto the drum prior to reaching the said cuspidal spaces.

13. An inking mechanism comprising a hard surfaced ink drum and pair of cooperating soft surfaced rollers, an ink rail having arcuate surfaces in cooperative relation to said drum and rollers and defining therewith oppositely facing small cuspidal ink holding spaces adjacent

the nips of the drum and rollers, the said rail having a line of orifices in its face adjacent the drum positioned close to the nip of one of said rollers and the drum and a second line of orifices in its face adjacent the drum and positioned close to the nip of the other said roller and the said drum, the ink rail surfaces being in wiping relation to the drum and both said rollers for smoothing out any globules thereon, a second hard surfaced drum cooperating with one of said rollers for taking ink therefrom and a third soft surfaced roller cooperating with 10

the two said drums for transferring ink from the first mentioned drum to the said second drum.

References Cited in the file of this patent

UNITED STATES PATENTS

1,901,076	Bechman	Mar. 14, 1933
1,962,011	Ginsberg	June 5, 1934
2,762,301	Cornell	Sept. 11, 1956