

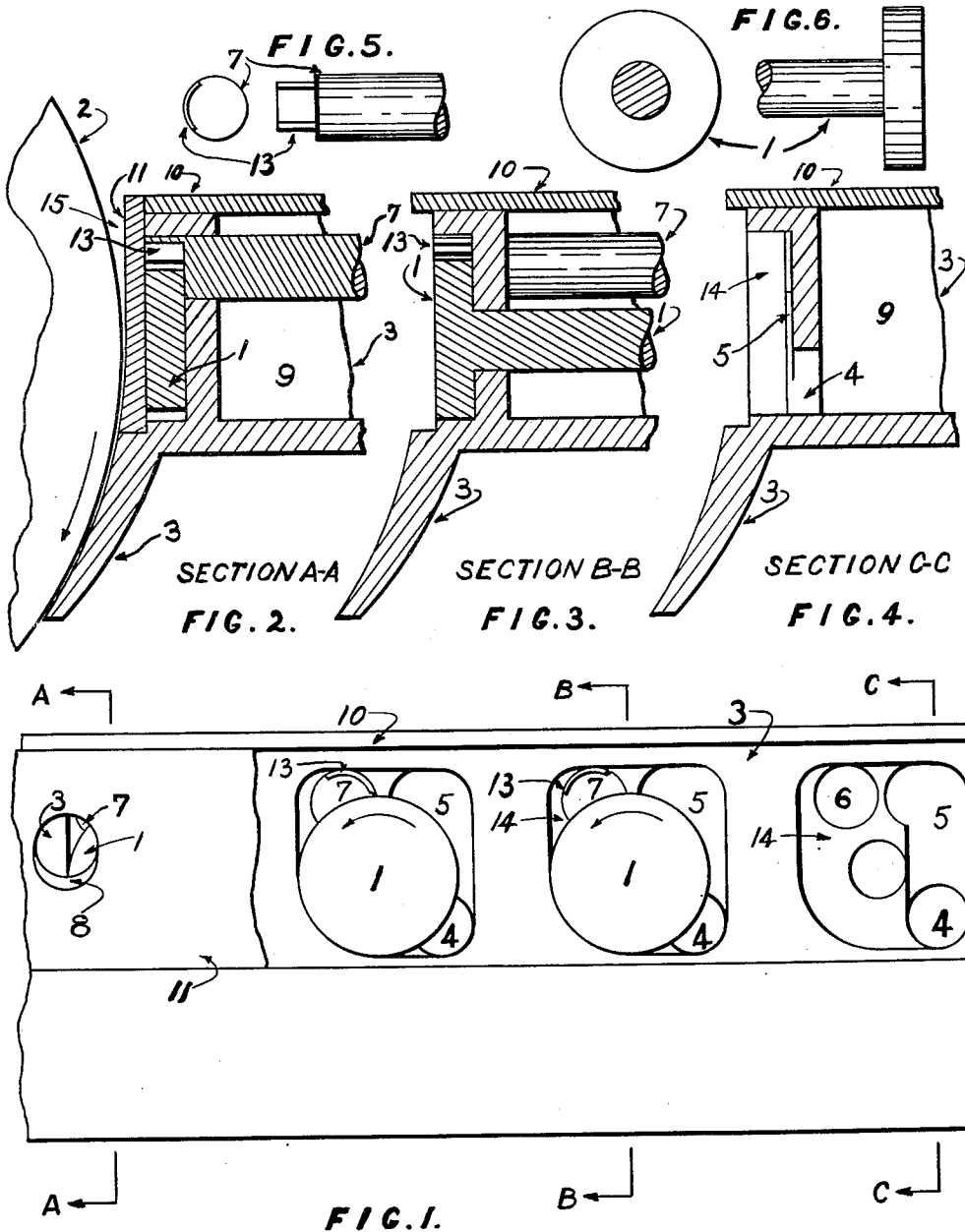
May 5, 1936.

J. J. HAROLD

2,039,992

INK FOUNTAIN FOR PRINTING PRESSES

Original Filed May 26, 1931 2 Sheets-Sheet 1



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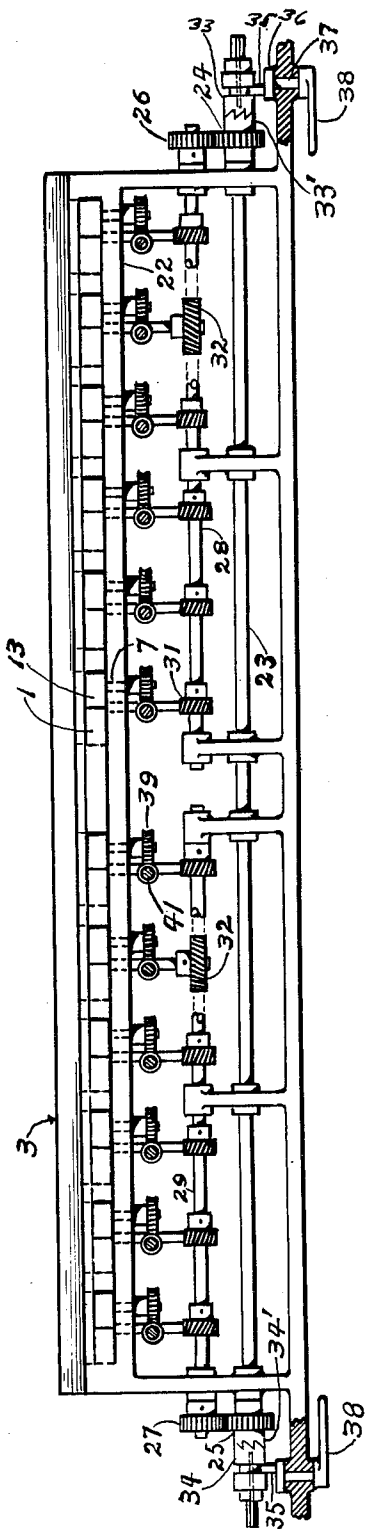
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- FIG. 2. -



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INK FOUNTAIN FOR PRINTING PRESSES

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This invention relates to improvements in inking mechanisms for printing machines and particularly for high speed rotary newspaper and magazine presses. One of the chief objects of this invention is to supply ink in a continuous stream or streams to the ink distributing cylinder of any class of printing press, with separate adjustments for the control of the supply of ink to any point of the printed page. Another important object of the invention is to locate said control of the supply of ink as closely as possible to the point of delivery to the ink distributing cylinder in order that there can never be more than a few drops of ink in actual transit from each unit of the apparatus, so that there may be no drip or slop when the press stops and no waiting for ink to appear when the press starts operating, regardless of the quality of ink in use.

Another important object of this invention is the provision of inking mechanism whereby ink may be applied substantially directly from an ink reservoir to an ink distributing cylinder or roller.

Another object is to provide improved inking mechanism whereby ink will be supplied to the distributing cylinder of a printing press in a substantially continuous stream and be properly spread over the surface thereof.

A further object is to provide a plurality of separate controls for the inking mechanism whereby the supply of ink deposited on the distributing cylinder may be controlled, to insure such distribution of the same over the surface of the cylinder as may be desired to insure proper ink supply to the printed matter.

Among other objects not specifically referred to here, the intention is to reduce the number of manufactured parts to as few separate pieces as possible. To this end the forms and designs of the chambers and passages in the body of the machine are to be regarded as parts essential to its operation. As the mechanism is totally enclosed most of it must of necessity be shown in section but where possible broken-away views are given of the interior so that its action may be readily understood.

It is also an object of the invention to provide ink fountains for printing presses of generally improved construction, whereby the device will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and ar-

range of parts, and in the details of construction hereinafter described and claimed.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a front face view of an ink fountain and inking mechanism embodying the features of this invention;

Figure 2 is a sectional view on line A—A of Figure 1;

Figure 3 is a sectional view on line B—B of Figure 1;

Figure 4 is a sectional view on line C—C of Figure 1;

Figure 5 is a side and end view of a valve member used in said mechanism;

Figure 6 is a side and end view of an ink feeding member used in said mechanism; and

Figure 7 is a top plan view, partly in section of a slightly modified form of the arrangement illustrated in Figure 1 with the cover plate of the ink fountain or reservoir removed, and with certain operating details included.

The mechanism selected to illustrate this invention is made up of units exactly similar in construction and performance. It should be understood that the construction and arrangement of the different mechanisms described here may be altered to suit the class of printing machine with which the apparatus is to be used and to obtain the results desired while retaining the invention as defined by the claims.

The apparatus consists of a metal casting running the full width of the printing press, cored out to form a trough or reservoir to contain a supply of ink and it is machined at one side to lie closely against the surface of one of the rotating ink-distributing cylinders 2 of the existing press. This metal casting will be hereinafter referred to as the ink-rail 3.

The front face of the ink-rail 3 is recessed at its upper portion along its entire length. A wall portion forming the back of the recess is provided with a plurality of substantially equally spaced apart countersunk openings, preferably corresponding to the columns of the printed sheet. A hole or conduit 4 extends through this wall and connects the interior of the reservoir with a recessed portion 5 formed in this wall in each of the aforesaid countersunk openings. Another hole or opening 6 is formed in the aforesaid wall between each of the countersunk openings and the interior of the reservoir in which the shaft portion 7 of a gate valve is journaled. The aforesaid wall portion forms the front wall of a

trough-like reservoir 9 extending lengthwise of said ink-rail 3.

The ink-rail 3 is provided with a top cover plate 10 disposed over the trough-like reservoir portion 9 and a front plate 11 disposed in the aforementioned recess in the front face of ink-rail 3. The front plate 11 is provided with a series of equally spaced apart openings or orifices 8 corresponding to the number of countersunk openings 10 formed in ink-rail 3. The orifices 8 connect these countersunk openings with the front face of plate 11 and the ink-rail 3, and are beveled downwardly and outwardly at the lower edges thereof. From the level of orifices 8, the front plate 11 is curved concavely to match the concave form of the lower portion of the front face of ink-rail 3, which substantially coincides with the curvature of the adjacent ink distributing cylinder 2. The radius of the curvature of ink-rail 3 is somewhat longer than that of cylinder 2 and the front face thereof is arranged in respect to the cylinder to cause the lowest point of the same to lie closer to the cylinder surface than this face does at the orifice 8, whereby the space between the cylinder and the front face of the rail 3 narrows downwardly. The face of the front plate 11 and of the rail 3 above the orifices 8, is formed tangential to the curve of the same, thus forming a substantially V shaped space 15 between the cylinder 2 and the rail 3. Between the front plate 11 and the aforesaid wall, forming the front wall of the trough-like reservoir 9, the aforesaid countersunk openings form chambers 14. A series of passageways are formed between the interior of the trough-like reservoir 9 and the front face of ink-rail 3 by the passageways or conduits 4, recessed portions 5, chambers 14, and orifices 8 through which ink may flow.

Referring to Figure 1, the first countersunk opening at the right hand side, is shown empty and illustrates the arrangement of passageways 4, 5, and 14. Figure 4 being a vertical cross section through the centre of the conduit 4, shows a side view of the recess 5 machined into the back of the chamber 14. On the inner surface of the front plate 11 is the counterpart of this recess machined to the same depth, and disposed exactly opposite to it so that this portion of the chamber is considerably wider than the remaining portion. A round hole is provided through the back wall of chamber 14 to act as a bearing for the shaft of the disc 1 and another hole 6, is drilled and reamed through the rear wall of the chamber to receive the gate valve 7; the hole 6 is disposed adjacent the upper edge of chambers 14 to one side of, and tangential to, a vertical plane through the axis of the disc 1.

The second or middle one of the three chambers, shown in Figure 1, shows the disc 1 and the gate-valve 7 in position, the latter being opened to its fullest extent. The disc 1 fills the remaining portion of the chamber 14 from back to front with enough clearance to allow it to revolve freely and no more, in a counter-clockwise direction as viewed. The end of the shaft portion of the semi-rotary gate valve 7 shown in Figure 5, comes flush with the rear face of the chamber 14, while a gate element 13 provided on the front end of the gate valve 7 is wholly inside the chamber and spans it completely reaching the rear face of the front plate, 11, with sufficient clearance to allow it to move freely around the axis of the shaft. Any convenient means such as set-collars or cotter-pins

may be used to keep the shaft portion of the gate valve 7 in its working position.

The third or left hand chamber, shown in Figure 1, shows the gate valve 7 completely closed. In this position the gate element 13 clears the periphery of the disc by a few thousandths of an inch, in order to avoid loss of power by friction and also to prevent wear of the parts. Moreover, the lower edge of the gate element 13 is beveled so that only the outer portion of the edge comes close to the disc; in order that the maximum of sensitiveness may be obtained for a given angle of rotation of the shaft of the gate-valve. This also lessens the friction of the ink-stream through the valve-opening.

The periphery of the disc fits the chamber only at its lower descending quarter, and at its sides clears the wall of the chamber by a few thousandths of an inch in excess of the minimum opening of the gate-valve. This clearance is to allow the very thin film of ink remaining when the valve is closed to descend to the bottom of the chamber.

The orifice 8 has the lowest point of its inner edge located on a level with the axis of the disc 1.

Ink is maintained at a predetermined level in the reservoir 9 and flows through the conduit 4 to seek its own level in the chamber 5. Ink of any viscosity that will flow may therefore be used.

The rotation of the disc carries the ink to the top of the chamber where it collects in a mass in front of the gate-valve.

The clearances 5 permit ink to travel up the sides of the rotating disc as well as on its periphery, so that the supply of ink at the top of the disc is far in excess of the amount needed for the proportion of the printed page to be served by each valve. As the width of the chamber at this point and beyond is the same as the thickness of the disc, the only ink-passage available is defined by the walls of the chamber, the periphery of the disc and the knife-shaped edge of the gate-valve. The controlled supply now passes on down with the disc 1 and into a downwardly tapering space formed between the periphery of the disc and the side wall of chamber 14 contacted thereby, its only means of exit being through the orifice 8 and into the V-shaped space 15. The effect on the stream of ink of the V-shaped space 15 in combination with the downward movement of the ink distributing cylinder 2, is to spread the ink out in a thin film on the surface of the ink distributing cylinder exactly as would a nozzle made of pipe flattened out.

The ink-film thus produced by the stream from an orifice is made continuous with the adjacent films from the orifices on either side of it, at any rate of speed of the discs, which rate is proportional to the speed of the press.

For the motion of the discs any convenient form of drive will serve to transmit the power from any convenient part of the moving mechanism of the press itself. The discs 1 may number five, six, seven, or even eight, to the width of an ordinary newspaper page. They may be driven separately from one shaft and disconnected by means of any convenient form of clutch, or they may be driven in gangs, each gang corresponding to a page or portion of a page, and each gang capable of being disconnected or silenced by any suitable make of clutch.

The regulating gate-valves may be directly con-

trolled by a hand adjustment at the end of each shaft away from the valve end or by any convenient form of control from the side of the press such as a reach-rod with regulating nut attached to a lever on the shaft or by means of a worm regulating-gear. They may be adjusted independently, or in gangs corresponding to a page or portion of a page, or the entire number serving the full width of the printed web.

The adjustment or control of the ink conveying discs 1 mentioned above, is illustrated by way of example in Figure 7 which shows means adapting the invention to be applied to mechanism suitable for printing upon a two page paper, it being understood that as many gangs or batteries of the discs with their coating elements will be provided, as may be required.

In the said Figure 7, wherein some of the details of construction are slightly modified, 22 designates a portion of a casing in which the stems of a plurality of ink conveying discs 1 of the type described above, are rotatably mounted. A driven shaft 23 which may be connected to any driven portion of the printing machine, is rotatably arranged in the said casing, the shaft 23 having at either end thereof gears 24-25 freely rotatable thereon. The gears 24-25 are adapted to be operatively engaged with coating gears 26-27 which latter are fastened to a pair of shafts 28-29 respectively. Each of the shafts 28-29 has secured thereto a plurality of worms 31, each of which is operatively engaged with a worm wheel 32 secured to the stem of each disc 1.

Slidably splined on opposite ends of the driven shaft 23 are clutch elements 33-34, each of these clutch elements having engaged in a groove thereof a crank pin 35 projecting from a plate or disc 36, the stem 37 of which is attached to an operating lever 38. It will be understood that when the operating levers 38 are moved to the positions shown in Figure 7, the clutch elements 33-34 will be operatively engaged with coating clutch elements 33', 34', formed as a component part of the above-mentioned gears 24, 25. When the levers 38 are swung to a position opposite to that shown, the clutch elements 33, 34 will be disengaged. In this manner, each battery of discs may be selectively thrown into and out of operation by manipulation of its adjacent clutch.

As further illustrated in Figure 7 and as indicated above, each gate valve 7 and consequently the gate element 13 attached thereto may be adjusted independently of the other gate valves. The stem of each gate valve 7, as shown in Figure 7, is provided with a worm wheel 39, each of which is engaged with a worm (not shown) secured to a shaft or stem 41 forming a part of a suitable operating handle (not shown). By turning the stems 41, each gate valve 7 may be adjusted to control the ink carrying capacity of its adjacent disc 1.

This invention has for its novelty and value the closeness of the point of regulation of the ink to the point of delivery on the ink-distributing cylinder, so that there is no delay in stopping and starting the supply; also that there is no mass of ink accumulated to drip and slop when the press slows down and stops. But its main value lies in the fact that there is no resistance to the passage of ink between the point of regulation and the point of delivery, so that the supply of ink is at all times exactly proportional to the speed of the discs and of the press

which drives them. 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 embodiments 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.

For this invention I claim:

1. In a printing machine the combination with an ink-distributing cylinder, of a reservoir supplying ink, means for conveying ink to an elevating chamber, means for raising ink by adhesion, a means of controlling the supply of ink, of a discharge orifice for delivery to the ink-distributing cylinder and means of spreading ink so delivered over the surface of the ink-distributing cylinder.

2. In a printing machine the combination of an ink-distributing cylinder, a reservoir for ink in an ink-rail, means for conveying ink to an elevating chamber, means for raising ink in said chamber by adhesion, means for controlling the stream of ink, said ink rail having a discharge orifice and being so located relatively to the ink cylinder as to provide a V-shaped space between the cylinder and the rail, said space serving to spread the ink in a continuous film over the surface of the ink-distributing cylinder.

3. In a printing machine the combination of an ink-distributing cylinder, a reservoir supplying ink in an ink-rail, means for conveying the ink to an elevating chamber, means for raising the ink in the chamber by adhesion, means for regulating the supply of ink, and a discharge orifice for delivering the ink to a V-shaped space designed to spread the ink over the surface of the ink-distributing cylinder in a continuous film.

4. In a printing machine the combination of an ink-distributing cylinder with a reservoir supplying ink, means for conveying ink to an elevating chamber, means for raising the ink in the chamber and a semi-rotary gate-valve having a knife-edged gate for regulating the supply of ink delivered through an orifice to a V-shaped space for delivering the controlled stream of ink to the surface of its distributing cylinder in a continuous film of variable thickness.

5. In a printing machine the combination of an ink-distributing cylinder with a reservoir for ink, means for conveying ink to an elevating chamber, a rotary disc having a cylindrical periphery to raise the ink by adhesion, a knife-edged valve to regulate the supply, a discharge orifice, and means for spreading the ink on the surface of the ink-distributing cylinder in a film of variable thickness.

6. In a printing machine the combination with an ink-distributing cylinder for a reservoir of ink, means for conveying ink to an elevating chamber so constructed as to allow ink to adhere to the sides as well as to the periphery of a revolving disc, a regulating gate-valve having a knife edged gate, a delivery orifice and means for spreading the controlled supply of ink on the ink-distributing cylinder in a film of variable thickness.

7. In a printing machine the combination with an ink-distributing cylinder, a reservoir for ink, a horizontal conduit leading the ink to an elevating chamber, a rotary disc for raising the ink to a regulating gate-valve, a discharge orifice and means for spreading the regulated sup-

ply of ink over the surface of the ink-distributing cylinder.

8. In an inking mechanism the combination with a reservoir for ink with a conduit for leading the ink to an elevating chamber, a disc for raising ink, coacting with a semi-rotary gate valve and the sides of the chamber to form a regulating port for regulating a stream of ink delivered through an orifice to a V-shaped space in front of the orifice for distribution to a printing machine.

9. In an inking mechanism the combination with an ink-reservoir of a plurality of orifices delivering ink independently of each other, of a plurality of regulating gate-valves capable of being operated independently of each other, a plurality of discs raising the supply of ink to the gate-valves, a plurality of elevating chambers and a plurality of conduits for supplying the chambers with ink independently of one another from an ink reservoir.

10. In an inking mechanism the combination with an ink reservoir of a plurality of ink conduits for conveying ink from an ink reservoir, a plurality of elevating chambers, a plurality of discs raising a supply of ink each independently of the other, a plurality of gate-valves each capable of stopping the supply of ink each independently of the others, delivering an interrupted film of ink to the ink-distributing cylinder by means of a plurality of orifices opening into a V-shaped space between the orifices and the ink-distributing cylinder.

11. In an inking mechanism the combination with an ink fountain of a plurality of conduits, a plurality of elevating chambers, a plurality of discs capable of being operated independently of one another, a plurality of gate-valves each co-acting with its own discs independently of any other, and with the sides of the corresponding elevating chamber to form a regulating port for controlling the thickness and continuity of the ink film spread on the surface of the ink-distributing cylinder.

12. In an inking mechanism the combination with an ink distributing cylinder, of an ink reservoir, a plurality of conduits, a plurality of ink elevating chambers, a plurality of disc-cylinders capable of being operated in separate gangs, each gang independently of each other, and a plurality of gate valves to supply regulated streams of ink to the ink distributing cylinder, with means for forming a film or films of ink of varied thickness on the said ink distributing cylinder.

13. In an inking mechanism, a chamber having an orifice, a rotary disc arranged in said chamber, a semi-rotary regulating gate-valve mounted in the chamber, said gate valve having a knife-edged element, said element coacting with the rotary disc for raising ink, and with the walls of the chamber containing said disc to form a regulating port for controlling a stream of ink delivered through said orifice for distribution to a printing machine.

14. In an inking mechanism for a printing machine, a rotary ink distributing cylinder, an ink rail adjacent said cylinder, said cylinder and ink rail being so positioned as to provide a V-shaped

space therebetween, said ink rail having an orifice formed therein communicating with the V-shaped space, whereby a continuous stream of ink may be directed to said V-shaped space through the orifice to spread a thin film of ink upon the surfaces of the ink distributing cylinder.

15. In an inking mechanism for a printing machine, the combination of an ink distributing cylinder, an ink rail adjacent said cylinder, an ink reservoir, an ink containing chamber arranged in said reservoir, a rotatable member mounted in the chamber, and a second member coactable with said rotatable member for regulating the amount of ink conveyable by said first mentioned member, said rotatable member and a wall of said chamber being so located as to provide a tapering space therebetween, said ink rail and cylinder being arranged to form a V-shaped space therebetween, whereby ink may be spread upon the ink distributing cylinder at a predetermined rate.

16. In a printing machine, an ink distributing cylinder, an inking mechanism comprising an ink-rail having an ink reservoir, and means to transfer ink from said reservoir to said cylinder, including a rotatable member disposed in connection with said reservoir and having its axis disposed at substantially right angles to the axis of said cylinder and being adapted to feed ink from said reservoir to an orifice opening in the front of said ink-rail.

17. In a printing machine, an ink distributing cylinder, an ink-rail having an ink reservoir and a front face disposed in close proximity to the peripheral surface of said cylinder, said ink-rail having an orifice connecting with the space between said cylinders and said front face, and means rotatably mounted in said ink-rail to feed ink from said reservoir in controlled quantities through the aforesaid orifice to the surface of said cylinder.

18. Means to feed ink to an ink distributing cylinder of a printing machine, including an ink-rail having an ink reservoir and a front face adapted to lie closely adjacent said cylinder, said front face having an orifice therein, and rotatable means in said ink-rail in connection with said reservoir to receive ink therefrom and feed it through the orifice to the front face of said ink-rail.

19. Means to supply ink to an ink distributing cylinder of a printing machine comprising an ink-rail having an ink reservoir and a front face, communicating passageways connecting said reservoir with said front face, rotatable means in one of the passageways to feed ink through the passageways from said reservoir to said front face, and means associated therewith to vary the rate of feed.

20. In a printing machine having an ink distributing cylinder, an ink-rail comprising a body portion having a trough-like reservoir formed therein, a front face portion curved to substantially coincide with the surface of said ink distributing cylinder, said ink-rail having a plurality of spaced apart passageways therein connecting said reservoir with said front face, and an ink feeding means associated with each passageway and rotatably mounted to said rail.

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