

[54] **DEVICE FOR DOSED DISPENSING OF A LIQUID MEDIUM, FOR INSTANCE, A DYE, TO ROLLERS IN PRINTING MECHANISMS OF PRINTING MACHINES**

[76] Inventor: **Wilhelm Schluckebier**, Bismarckstr. 1, Koblenz, Germany

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[51] **Int. Cl.**..... **B41f 31/08**

[58] **Field of Search**..... **101/365, 364, 366**

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Primary Examiner—Ernest T. Wright, Jr.

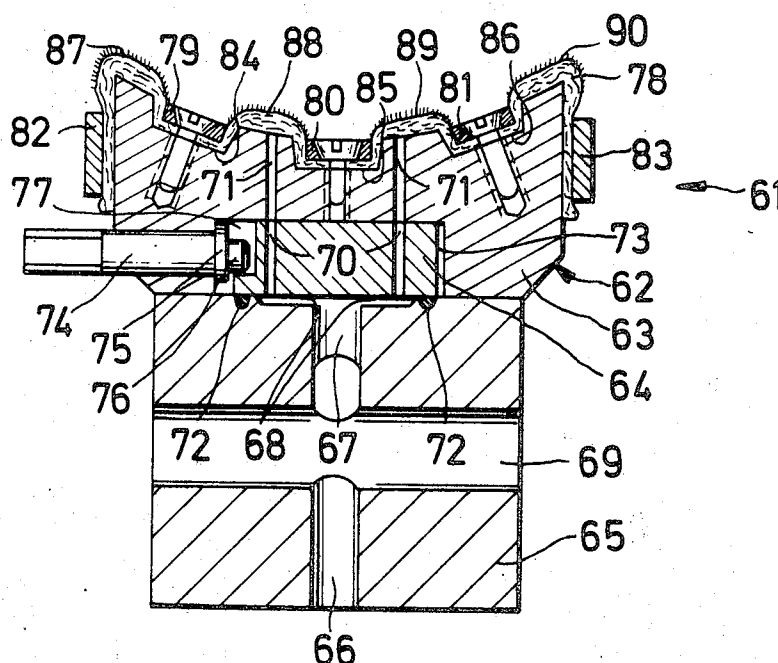
Assistant Examiner—William Pieprz

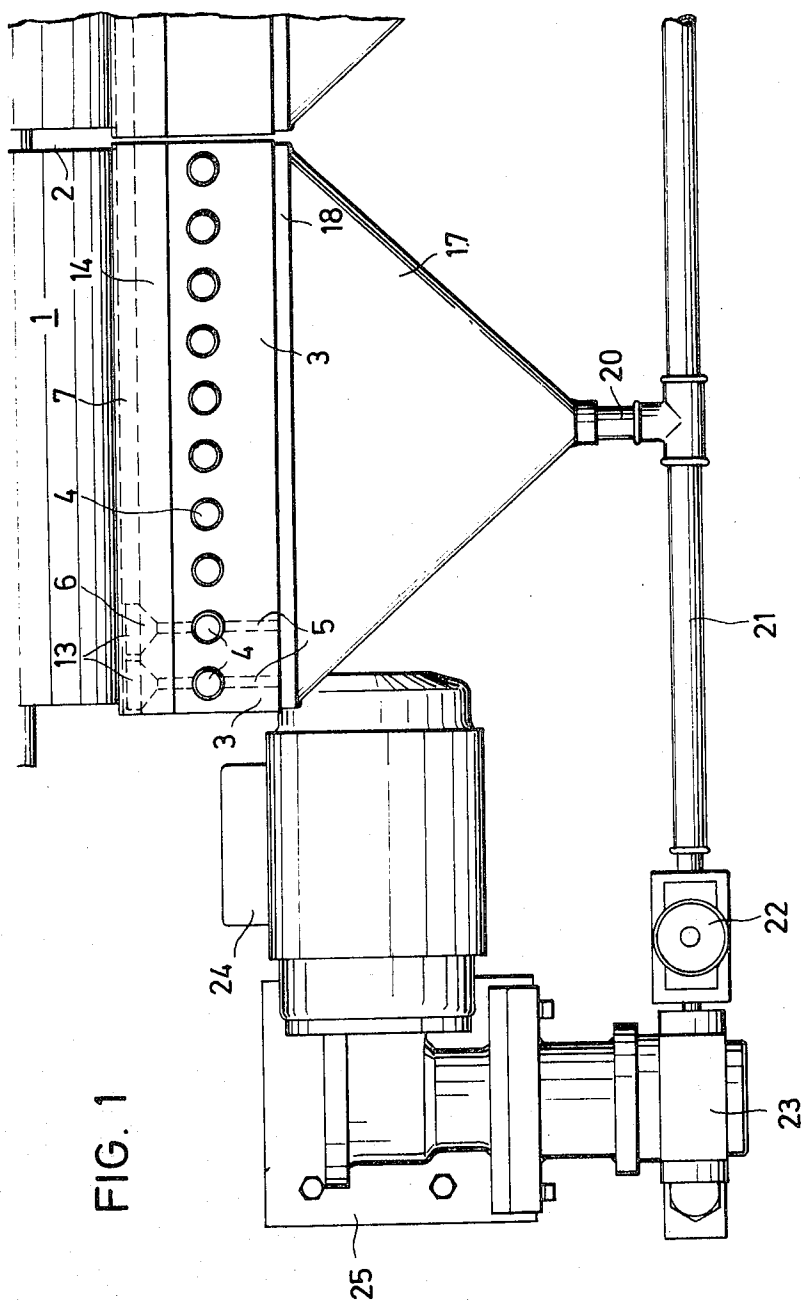
Attorney, Agent, or Firm—Walter Becker

[57] **ABSTRACT**

An apparatus for supplying liquid to a printing roller or the like, for example, liquid dye, in which at least one body extending axially of the roller to be supplied is provided with passage means distributed therein in the direction of the length of the roller and adapted for adjustment as to effective cross sectional area thereby to control the liquid supply to the roller. Preferably, a plurality of such bodies are arranged in end to end relation along the roller and each passage and each body supplies a certain axial region of the periphery of the roller.

4 Claims, 14 Drawing Figures





INVENTOR.
Wilhelm Schluckebier
 BY *Walter Ducky*

Fig. 2

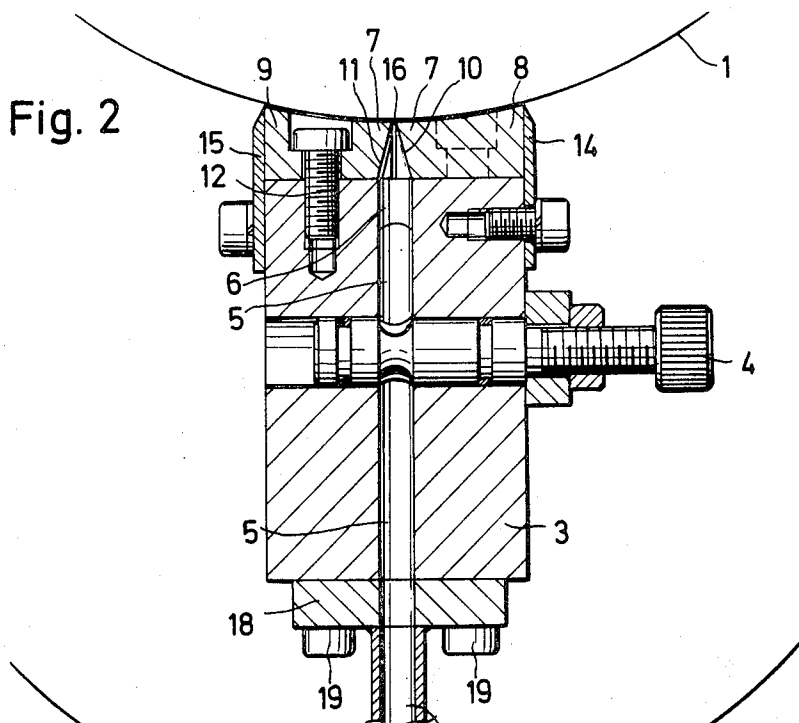
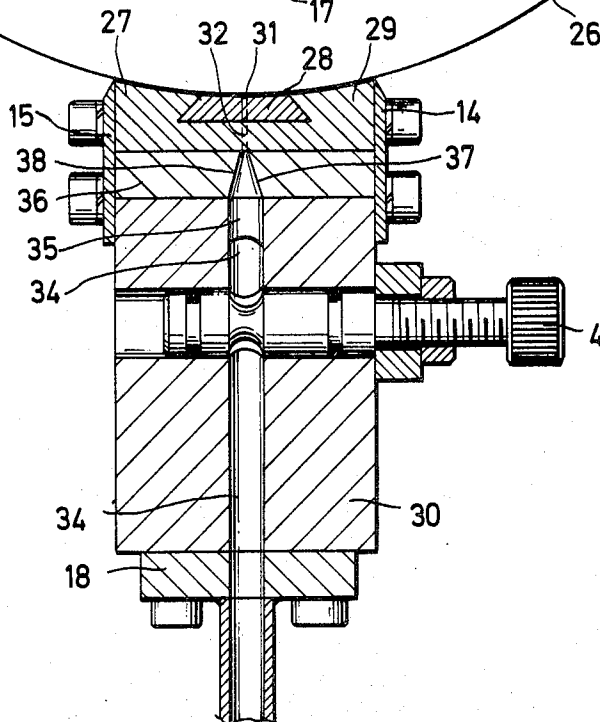


Fig. 3



INVENTOR.
Wilhelm Schluckebier
 BY *Walter Becker*

FIG. 4

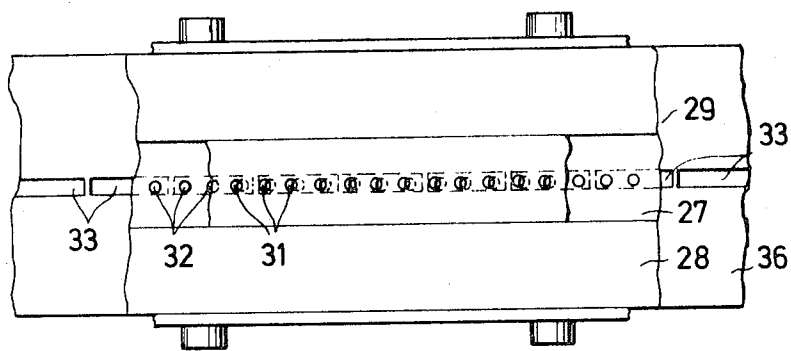
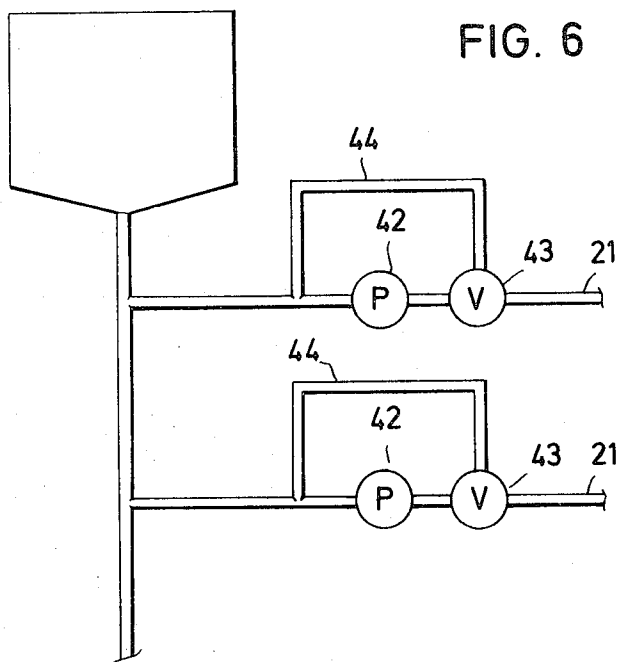


FIG. 6

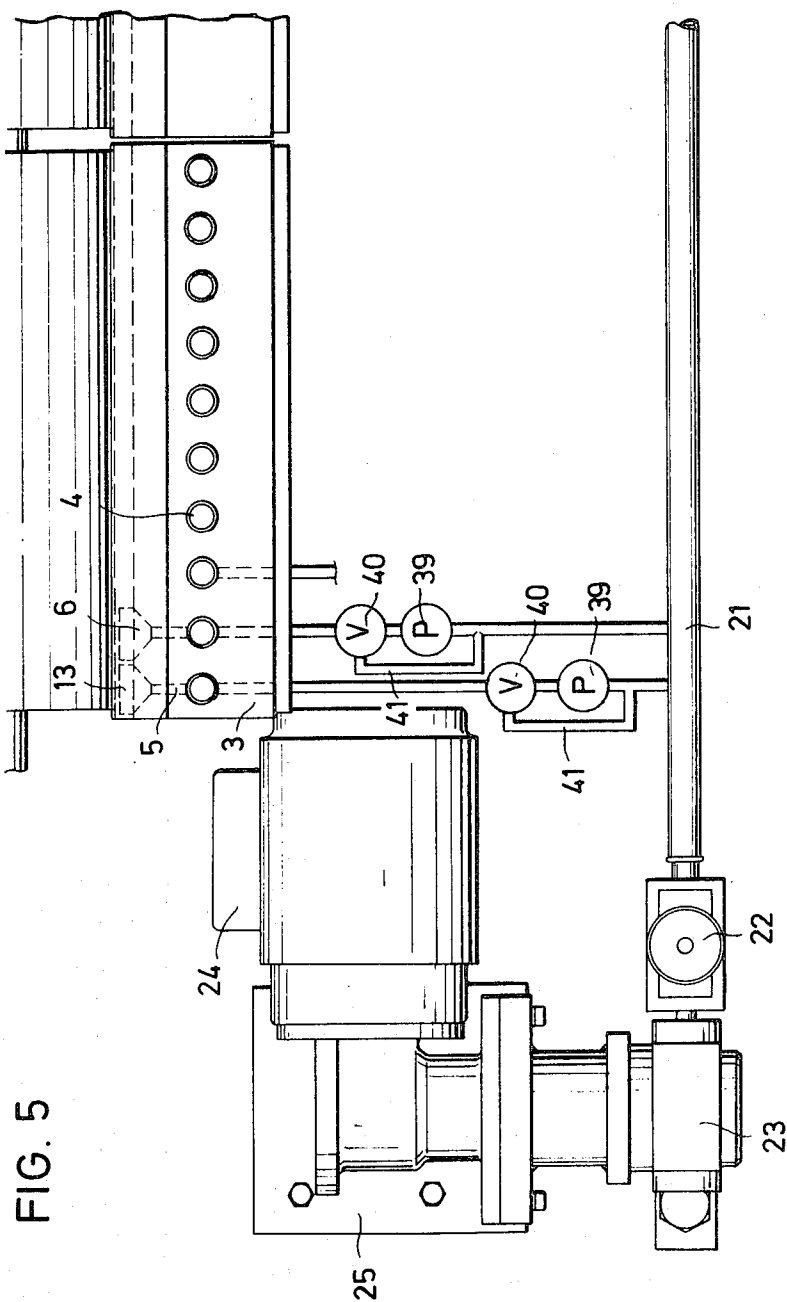


INVENTOR.

Wilhelm Schluckebier

BY

Walter Becker



INVENTOR.
Wilhelm Schluckebier
BY
August Becker

FIG. 7

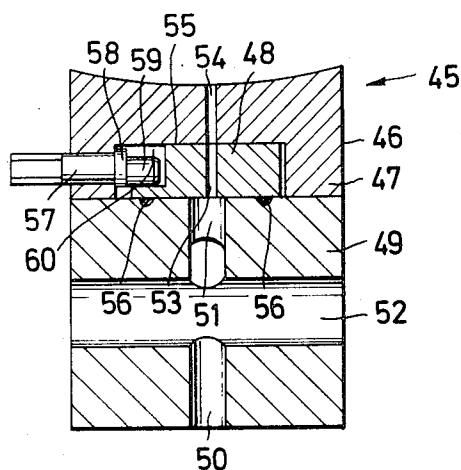


FIG. 8

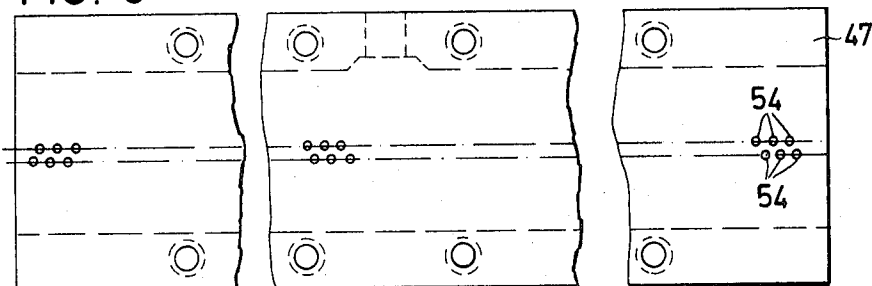


FIG. 9

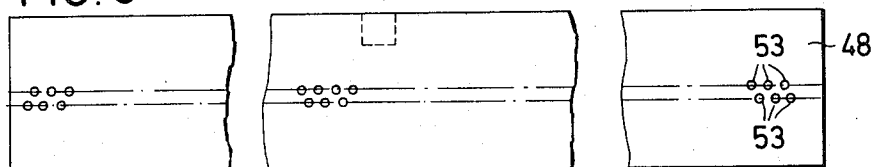
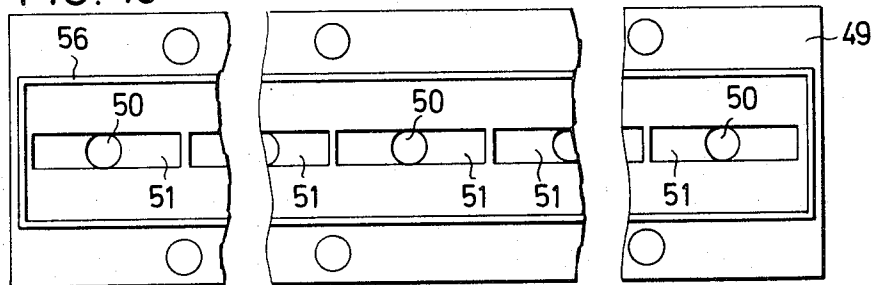


FIG. 10



INVENTOR.
Wilhelm Schluckebier
 BY
Walter Becker

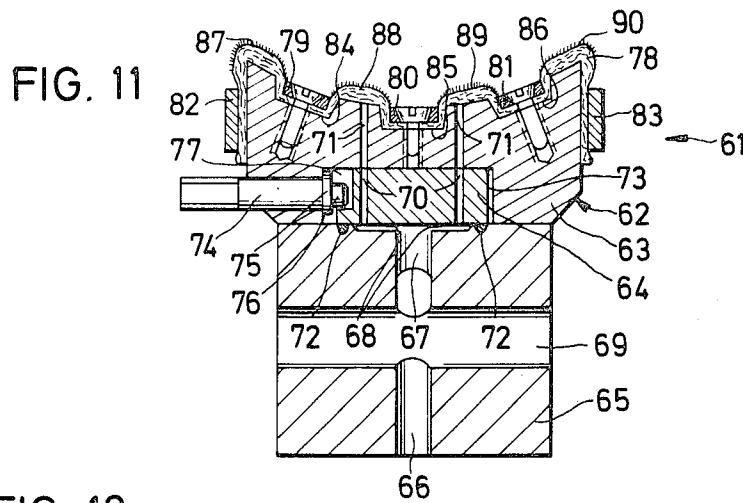


FIG. 12

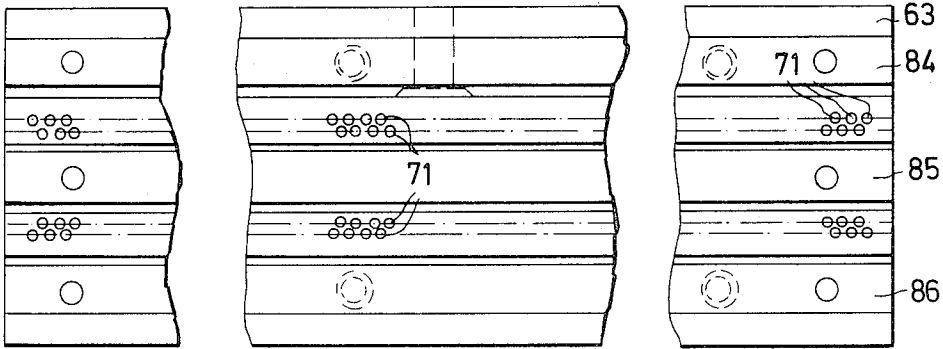


FIG. 13

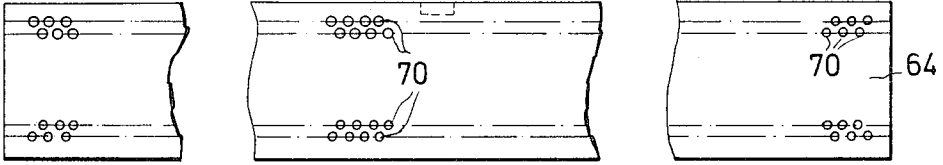
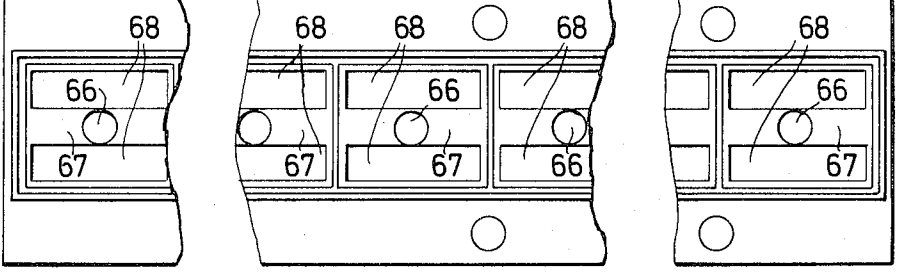


FIG. 14



INVENTOR.
Wilhelm Schluckebier
BY
Walter Becker

DEVICE FOR DOSED DISPENSING OF A LIQUID MEDIUM, FOR INSTANCE, A DYE, TO ROLLERS IN PRINTING MECHANISMS OF PRINTING MACHINES

The present invention relates to a device for a dosed dispensing of a liquid medium, for instance, a dye, to rollers in printing mechanisms of printing machines, by means of a body which is arranged in the axial direction of the rollers within the region of the outer mantle or surface of a roller and which is adapted to permit the medium to pass through the body to which latter the medium is conveyed under pressure.

With a heretofore known device of the type involved, the medium under pressure is conveyed to a rod of porous material. The through-flow resistance of this material for the medium is, for instance, with the prevailing viscosity of a dye as the latter is employed in dyeing mechanisms of offset printing machines so designed that within the region of the customary printing speeds in conformity with the respective requirements there will be possible a precisely dosed dispensing of the dye to the dye mechanism.

The above mentioned heretofore known device, however, has the drawback that it cannot be employed when liquid media, for instance, a dye with viscosities differing extensively are to be utilized. Alone, by means of the valves present in the feeding lines for the medium, this heretofore known device cannot be adapted to greatly varying viscosity conditions of the medium being conveyed to the printing mechanism. Also, the change in the pressure at which the medium stands or by means of which the medium is conveyed is possible only within narrow limits, in view of the problem to discharge media with considerably different viscosities in the desired quantity per time unit. Moreover, with the above mentioned heretofore known device certain difficulties are encountered due to the fact that the dispensing of the medium is by no means effected proportionally with the change in the pressure, but instead the dispensing is performed in relationship to the applied pressure, and more specifically, according to a more or less curved cam the course of which varies considerably with the viscosity. Moreover, with an assumed control of the pressure acting upon the medium, considerable expenses are necessary in view of the above mentioned conditions so that a solution of the above indicated problem in this direction is not worthwhile for economical reasons.

It is, therefore, an object of the present invention to provide a device for dosed dispensing of a liquid medium in a simple manner and in such a way that an adaptation to the viscosity of the particular medium used can be effected quickly without difficulties.

These and other objects and advantages of the invention will appear more clearly from the following specification, in connection with the accompanying drawings, in which:

FIG. 1 shows a front view of a device for dosed dispensing of a liquid medium.

FIG. 2 is a side view of the device according to FIG. 1, but in section and on a greater scale than that of FIG. 1.

FIG. 3 shows a section of another possible embodiment of the device according to the invention.

FIG. 4 shows a portion of the device of FIG. 3 in top view.

FIG. 5 illustrates a device according to the invention in which the medium is conveyed to the individual zones of the device by separate pumps.

FIG. 6 diagrammatically illustrates a portion of the devices for supplying the liquid medium.

FIG. 7 shows the side view of the more important elements of another embodiment of a device according to the invention.

FIG. 8 is a top view of a portion of the rod according to FIG. 7.

FIG. 9 is a top view of the other part of the rod of the device according to FIG. 7.

FIG. 10 is a top view of the distributing block of the device according to FIG. 7.

FIG. 11 is a section through the essential elements of another device according to the invention which is particularly suitable for dispensing humidifying medium or moist liquid.

FIG. 12 shows a top view of one portion of the rod of the device according to FIG. 11.

FIG. 13 shows a top view of the other part of the rod of a device according to FIG. 11.

FIG. 14 is a top view of the distributing block of the device according to FIG. 11.

The device according to the present invention for dosed dispensing of a liquid medium, for instance, a dye, to rollers in printing mechanisms of printing machines by means of a body which is arranged in axial direction of the rollers within the region of the mantle surface of a roller and which is adapted to permit the medium to pass through the body to which the medium is conveyed under pressure is characterized primarily in that the body permitting the medium to pass there-through is formed by a divided rod with one or more gap openings which latter are adjustable.

According to a particularly advantageous embodiment of the invention, the two parts of the rods are in the flow direction of the medium located adjacent to each other in a plane while forming one or more gap openings, said two parts being adjustable relative to each other in the machine frame.

According to still another embodiment of the invention, the parts of the rods are provided with bores, or the like, which are evenly spaced from each other in the flow direction of the medium. These bores, or the like, are in flow direction of the medium arranged one behind the other and are adapted to be adjusted relative to each other and transverse to the flow direction of the medium.

In order to be able to set or control the dispensing of the medium over the distance of the width of the printing mechanism in different ways, it is suggested, according to a further feature of the invention, to subdivide the gap opening seen in axial direction of the rollers in zones which are substantially separated from each other and which have the same extension, while each of said zones has associated therewith a control device for controlling the supply of the medium.

In order to be able to control the dispensing of the medium as precisely as possible, and in order when the printing mechanism is at a standstill to prevent a post flowing of the medium from the body (as it is possible with heretofore known devices), it is suggested according to a further advantageous feature of the invention to provide one or more pumps for feeding the medium, which pumps are adapted to be controlled with regard to their delivery.

For the supply of the medium to the divided bar, it is possible in conformity with a further embodiment of the invention that preferably each section of a distributing block which has bores leading to the gap opening or openings has associated therewith a funnel widening toward the bores of said block for the supply of the medium, said section preferably corresponding to the width of the way covered therewith.

According to another preferred embodiment of the invention, each of the feeding lines to the zones of the gap opening has interposed therein a pump adapted to be controlled as to its delivery.

In order to make sure that the dispensing of the medium is effected automatically in precisely predetermined quantities and proportionally with regard to the printing speed, according to another feature of the invention, gear pumps or similar pumps are provided with feed in proportion to the driving speed and which are driven by the rollers of the printing mechanism. For purposes of a precise adjustment or setting of the quantity of the medium respectively to be dispensed, it is preferred that the exit of each pump is connected to the inlet of a controllable valve, one exit of which, communicates with a feeding line toward the divided rod or to a zone while the other exit communicates with a return conduit leading to the inlet of the pump. For purposes of the supply of the printing mechanism with the medium which latter is separately supplied for the different zones, the medium is conveyed to the gap opening or openings of the divided rod through funnel-shaped portions which widen toward the rod and are arranged adjacent to each other and separated from each other.

The device according to the present invention is advantageously used in connection with printing machines in which, for instance, dyes of different viscosities are employed. However, it is also possible that the device according to the invention be used with media other than dye, for instance, for dispensing humidifying means in connection with offset printing operations.

Referring now to the drawings in detail, FIG. 1 illustrates a portion of a roller 1, the mantle surface of which, is provided with grooves 2, said grooves 2 being spaced from each other by a distance equaling approximately one quarter of the total width of the roller, or a web adapted to pass over the roller. According to the showing in FIG. 1, a distributing block 3 is provided below the roller 1 and is equipped with bores 5 having one end leading into funnel-shaped widening portions 6. Each bore 5 of the distributing block 3 has associated therewith a valve 4 which is manually adjustable. Adjacent the distributing block 3 and more specifically, on that side of the distributing block which faces toward the roller 1, there is provided a divided rod or bar 7 (FIG. 2). The two portions 8 and 9 of rod 7 are, when viewing the device in the flow direction of the medium, located adjacent to each other on the distributing block 3. Those sides, 10 and 11, of the two parts, 8, 9, which are located opposite to each other are slanted in such a way that the spacing of the two parts, 8 and 9, from the width of the funnel-shaped widened portions 6 at one end of the distributing block is reduced to a narrow gap opening 6 within the region of roller 1. Those sides of the two parts, 8 and 9, which belong to the divided rod 7 and face toward the roller 1 are adapted to the curvature of the roller 1 and are arranged in spaced relationship to roller 1, for instance,

at a distance of from 0.3 to 0.8 millimeters, which distance forms a contact gap.

According to FIG. 2, the parts 8 and 9 are connected to the distributing block 3 by means of threaded bolts 12. This connection, however, is so effected that a movement of the parts 8 and 9 relative to the distributing block and transverse to the flow direction of the medium is possible, in other words, transverse to the direction of the bores 5. By means of a device, not shown in the drawing, the parts 8 and 9 may be moved or adjusted, more or less relative to each other. Preferably, the adjustment is effected by means of a micro-screw or the like in order to effect a fine adjustment.

As will be evident from FIGS. 1 and 2, the slanted sides 10 and 11 of parts 8 and 9 extend not all the way through over the entire portion 8 or 9, but instead, the sides 10 and 11 extend over certain zones 13, as shown in FIG. 1. Between the individual zones, therefore, remains only a minor gap which separates adjacent zones from each other so that in view of the high through-flow resistance of this gap, for instance, the dispensing of dyes within the region of a zone is substantially independent for the dispensing of a dye in the adjacent zone. Aside from the pressure acting upon the medium, the dispensing of a dye within the region of zone 13 of rod 7 is determined by the adjustment of the respective valve 4.

In order to be sure that the medium, for instance, the dye applied to the roller 1 will not exceed a certain thickness, additional knives or blades 14 and 15 are provided for fine adjusting the thickness of the applied medium. The quantity of the medium applied per time unit is, however, not determined respectively by the blades 14 and 15 or by the distance of the parts 8 and 9 from the roller 1 but collectively exclusively on the pressure to which the medium is subjected and on the adjustment of the valve 4 as well as on the setting of the gap opening 16 between the parts 8 and 9.

At the other end of the distributing block, the bores 5 lead into a funnel 17 which, by means of a flange 18 and screw bolts 19 is connected to the distributing block 3.

The funnel 17 ends in a connection 20 which is connected to a feeding line 21 for the medium. The feeding line 21 is connected to a quantity control or regulator means 22 which communicates with a displacement pump 23. The displacement pump 23 delivers the medium from a nonillustrated container and through non-illustrated conduits to the control 22 and through the latter and feed line 21 into the funnel 17. A motor 24 through a transmission 25 drives the displacement pump 23 which may consist, for instance, of a gear pump. Advantageously, the drive of the gear pump is, in a nonillustrated manner, derived from the drive for the printing mechanism.

FIGS. 3 and 4 of the drawing illustrate a modification of the device according to the invention. Within the region of a partially illustrated roller 26 there is provided one portion 27 of a divided bar 29. The two parts 27 and 28 of the divided bar 29 are displaceably arranged on the distributor block 30 so as to be displaced relative to each other in a direction transverse to the direction of flow of the medium. The device for guiding and displacing the two parts 27 and 28 of the divided bar 29 relative to each other is not illustrated in FIGS. 3 and 4. For purposes of adjusting the parts 27 and 28 relative to each other there is provided, for instance,

for fine adjustment, a micrometer screw, or the like. Part 27 is guided and arranged in part 28 of bar 29 by means of a dovetail guiding arrangement. Those sides of parts 27 and 28 which face the roller 26 are curved in conformity with the curvature of the roller 26.

In the parts 27 and 28 of bar 29 and arranged at even distances there are provided bores or the like, 31, 32. Depending on the relative position of parts 27 and 28 with regard to each other, the openings made free or cleared for the medium are ample, as will be evident from FIG. 4. Preferably, also with the embodiment of FIGS. 3 and 4, the supply of medium is subdivided by zones. With the embodiment of FIGS. 3 and 4, effectively there is better separation of individual zones designated with the reference numeral 33 than the separation of the individual zones as effected with the embodiment of FIGS. 1 and 2.

For purposes of forming zones 33, the bores 34 of the distributor block 30 end in funnel-shaped widened portions 35. Adjacent to the funnel-shaped widened portions 35 and on the distributing block 30 there is provided an intermediate plate 36 which, by means of the slanted sides 37 and 38 leads from the funnel-shaped widened portion 35 to a gap preferably of a width which corresponds to a zone formation.

FIG. 5 shows a plurality of pumps 39, one of which is associated with a bore 5 of a distributing block 3. The inlets of pumps 39 are connected to the feeding line 21, whereas the outlets of pumps 39 are connected to the inlet of valves 40. One exit of each valve 40 communicates with a return line 41 which leads to the inlet of the respective pump 39. Connected to the other exit of each valve 40 is the respective bore 5 having one end leading into widening portion 6 of the distributing block 3. This connection is effected through conduits not designated further. By means of the pumps and the particular control illustrated in FIG. 5, it is possible to carry out the application of the medium in a precisely predetermined quantity per time unit and automatically while in particular gear pumps may be utilized.

Furthermore, it is possible in conformity with FIG. 6, for instance, to provide one separate pump 42 each for each quarter of the width of a web, said pump being connected through a valve 43 to a feeding line 44. Pumps 42 operate with the pertaining valves 43 in the same manner as the pumps 39 operate with the valves 40 according to FIG. 5.

With an embodiment of the present invention as illustrated in FIGS. 3 and 4, for purposes of a still more uniform dispensing of the medium in axial direction of the roller there is provided a plurality of adjacent rows of bores. The bores of one row being offset in location relative to the bores of the adjacent rows located in the divided bar. The utilization of an intermediate plate shown in the embodiment of FIGS. 3 and 4 is not absolutely necessary. However, such intermediate plate is not necessary under all circumstances with the embodiment of FIGS. 3 and 4. The divided bar could be arranged directly on the distributing block.

FIGS. 7 and 8 illustrate the essential elements of a device, the manufacture of which, is more simple and more economical than the manufacture of the device according to FIGS. 3 and 4. With the last mentioned device, accurate manufacture of the fitting of the two parts of the rod to assure that the device will work properly may have difficulties encountered therewith.

The device according to FIGS. 7 to 10, and generally designated 45 comprises a bar 46 with the parts 47 and 48 and the distributing block 49. The distributing block 49 is provided with bores 50 which end with funnel-shaped widening portions 51. In the cores of the bores 50 there are provided transverse bores 52 in the distributing block into which there are inserted valves (not shown for the sake of simplicity). Within the region of the widened portion 51 there are provided two rows with bores 53 in part 48 of bar 46. Opposite to said two rows with bores 53 there are located two rows with similar bores 54 which are provided in the part 47 of bar 46.

Part 47 has that side thereof which faces the distributing block 49 a recess 55 of rectangular cross section within which there is provided the part 48 which is located between part 47 and distributing block 49. In the separating plane between part 48 and distributing block 49 there is located a rotating seal 56. This seal on one hand prevents the escape of dye or humidifying fluid within the region of the separating plane between bar 46 and distributing block 49 and on the other hand makes it possible in view of its elasticity to manufacture the part 48 and recess 55 with relatively great tolerances. It is possible also to provide a seal on that side of part 48 which is located opposite the seal 56, and, more specifically, between part 48 and part 47 of bar 46. However, this is not necessary under all circumstances. Suitable materials for the seal are available in great selection to any expert in the field.

For purposes of adjusting the part 48 relative to the part 47 of bar 46, there is provided a bolt 57 which is rotatably journaled in part 47 and which, for instance by means of a collar 58 rests against part 47 to prevent axial movement toward the outside. On bolt 57 and eccentrically arranged with regard to the axis of rotation of the bolt there is an extension 59 which engages in a corresponding recess 60 provided in one side of part 48. The outer end of bolt 57 is provided, for instance, with a hexagonal head by means of which the bolt may be turned and the part 48 may be adjusted to a satisfactory extent relative to the part 47 of bar 46.

The device according to FIGS. 11 - 14 is provided for the release of moistening fluid. This device, similar to the device of FIGS. 7 - 10, shows merely the essential elements necessary for the explanation of the operation.

More specifically, FIG. 11 shows a device generally designated 61 which primarily comprises a bar 62 with parts 63 and 64 and a distributing block 65. Bores 66 serve for supplying humidifying fluid to the bar 62. The bores 66 end in funnel-shaped widened portions 67 of which adjacent widened portions are separated from each other merely by a relatively narrow web located in the separating plane between parts 64 and distributing block 65. Transverse to the longitudinal extension of bar 62, the widened portions 67 end in widened portions 68 of a pan-shaped cross section.

In the distributing block 65 there are provided bores 69 for the insertion of nonillustrated valves adapted to permit and interrupt the passage of the medium through the bore 66 and to vary the flow therethrough. In parts 63 and 64 of bar 62 there are provided two double rows of bores 70, 71 which rows are substantially parallel to each other.

Similar to the device according to FIGS. 7 - 10, also in this instance, a rotating seal is provided which is des-

ignated with the reference numeral 72 and which is located in the separating plane between distributing blocks 65 and 64 of bar 62. Part 64 is located in a recess 73 of part 63, which recess is of rectangular cross section. The advantages realized with the embodiment of FIGS. 7 - 10 over the embodiment of FIGS. 3 and 4 also apply in this instance.

Part 64 is adjusted relative to part 63 by means of a bolt 74 which by means of a collar 75 rests against part 63 and carries an extension 76 which is arranged on the bolt 74 and carried eccentrically with regard to the axis of rotation of bolt 74. The extension 76 engages in a corresponding recess 77 provided in one side of part 64. The adjustment of part 64 relative to part 63 is effected, for instance, by means of engaging an outer hexagonal head on bolt 74.

That side of part 63 which is not illustrated faces the roller which withdraws the moistening fluid and is provided with a textile cover 78. The cover 78 is, by means of three tensioning strips 79, 80 and 81 extending in the longitudinal direction of bar 62 clamped to the respective side of part 63. The two ends of the cover 78 are fixed laterally on part 63 by means of further clamping strips 82 and 83. The clamping strips 79 - 83 are expediently by means of non-further described and illustrated bolts screwed onto part 63. The clamping strips 79 - 81 are inserted in grooves 84, 85, 86 on part 63. As a result thereof, there are formed elevations 87 - 90 of the cover 78 which follow each other in the direction of movement of the mantle of the roller. The elevations 88 and 89 convey the fluid supplied through bores 71 to the roller through pad or velvet-like fiber layer means of the cover 78. The elevations 87 and 90 merely serve for removing the paper dust and other undesired deposits from the roller surface.

It is, of course, to be understood that the present invention is, by no means, limited to the particular showing in the drawings, but also comprises any modifications within the scope of the appended claims.

What is claimed is:

1. An apparatus for the controlled dispensing of a liq-

uid medium, such as dye, to a roller in a printing machine and comprising in combination: body means extending axially of the roller and adjacent the periphery thereof, liquid supply means connected to said body means on the side facing away from the roller, passage means extending through said body means to the side facing said roller to convey said liquid from said supply means to said roller, adjustable gap opening means carried by said body means adjacent said roller and including means for adjusting the effective area of the passage means, said adjustable gap opening means comprising a pair of bar elements parallel to and extending in the axial direction of said roller and relatively adjustable to adjust the effective area of said passage means, said bar elements being in superimposed relation to each other in the direction of flow in said passage means and said passage means being in the form of bores in said bar elements, said bar elements being relatively adjustable in the direction of the length of said roller to vary the degree of registration of said bores, said body means being concave on the side adjacent the roller so as to fit closely about a portion of the circumference of said roller, and a fabric cover on the body means covering said concave roller side and having the properties of conducting liquid from the passage means to said roller and of wiping the surface of said roller.

2. An apparatus in combination according to claim 1 in which said passage means comprises a plurality of passages distributed in the axial direction of said roller, and bores at the end of said passages adjoining said roller being arranged in circumferentially spaced axial rows.

3. An apparatus in combination according to claim 2 in which said body means includes recess means communicating on one side with a respective passage and on the other side with the said bores pertaining to the passage.

4. An apparatus in combination according to claim 2 in which the bores in each said row of bores are staggered when viewed in the radial direction of said roller.

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