March 30, 1937. E. BUCKINGHAM 2,075,568

INKING MECHANISM FOR ROTARY PRINTING MACHINES

Filed March 21, 1934 6 Sheets-Sheet 1

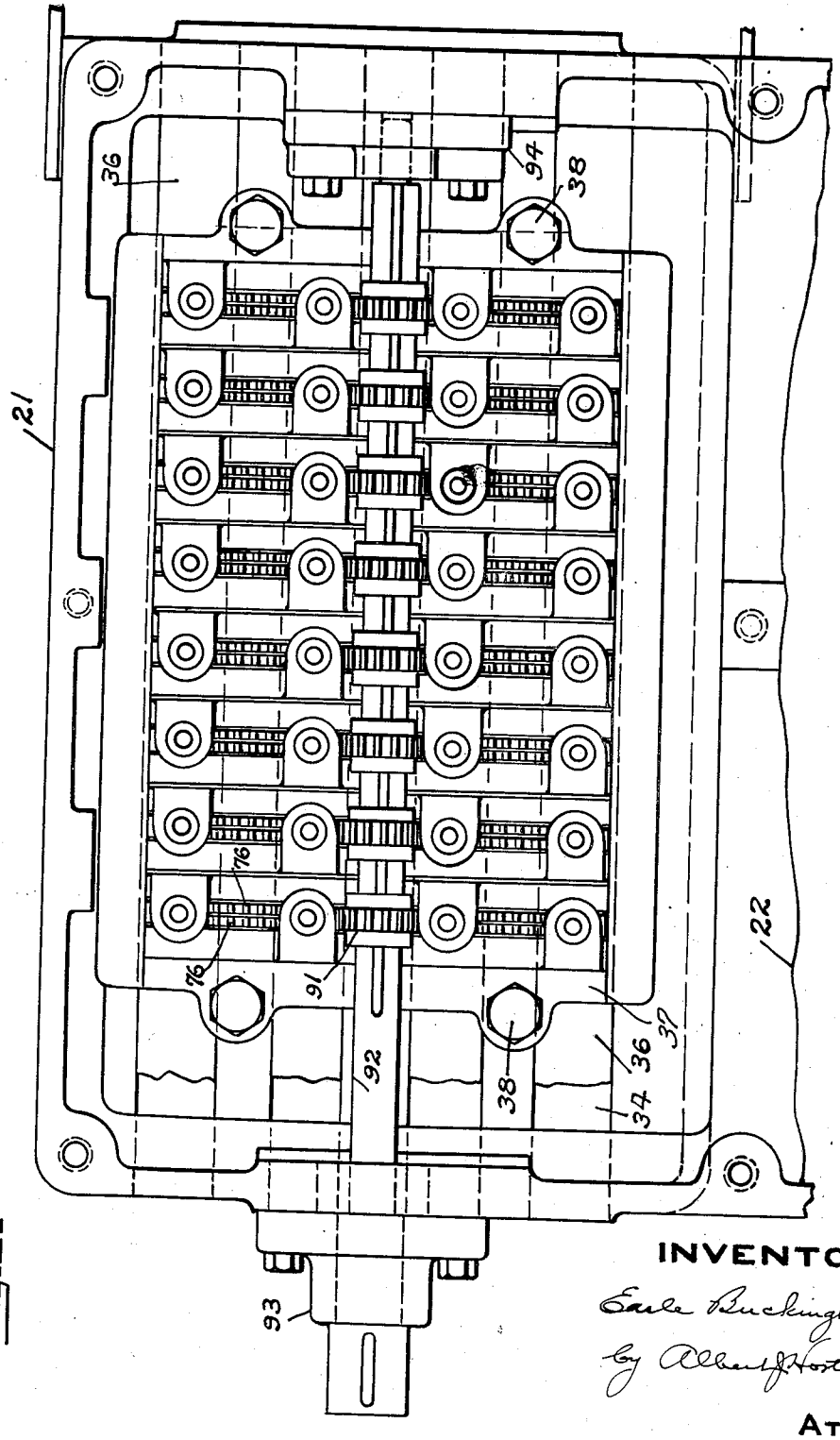


Fig. 1.

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INKING MECHANISM FOR ROTARY PRINTING MACHINES

Filed March 21, 1934 6 Sheets-Sheet 2

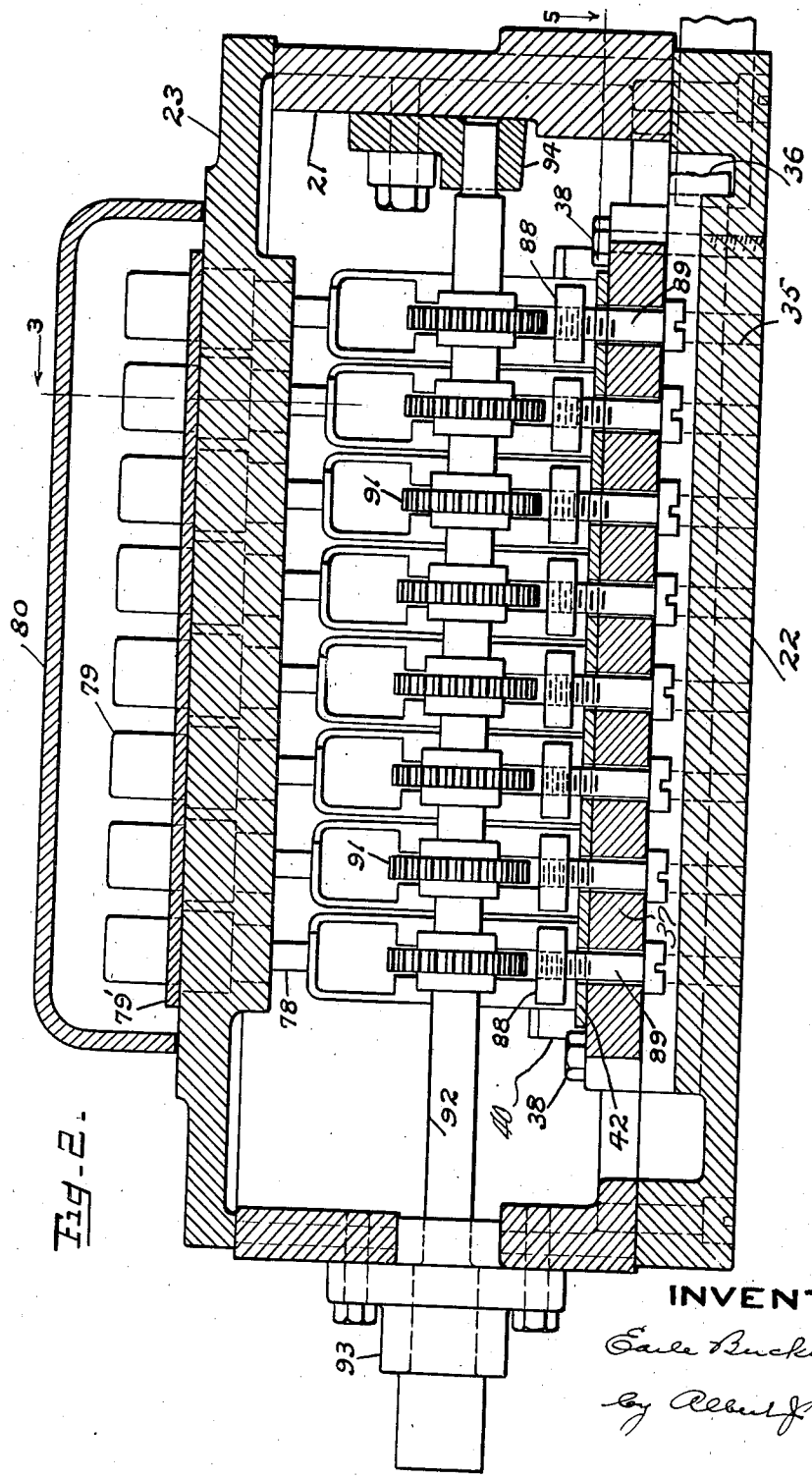


Fig. 2.

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INKING MECHANISM FOR ROTARY PRINTING MACHINES

Filed March 21, 1934 6 Sheets-Sheet 3

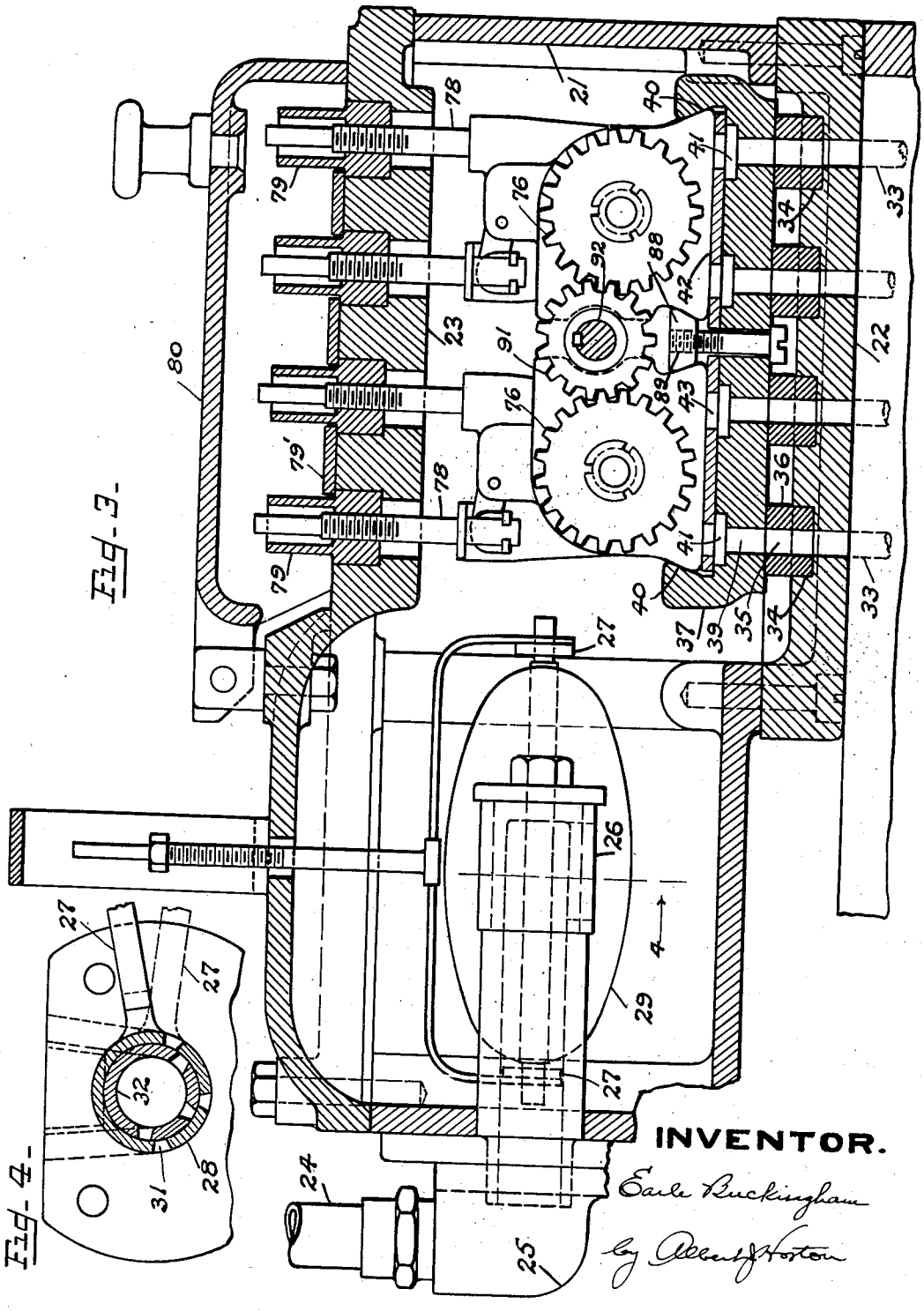


Fig. 3.

Fig. 4.

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March 30, 1937. E. BUCKINGHAM 2,075,568

INKING MECHANISM FOR ROTARY PRINTING MACHINES

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Fig. 5.

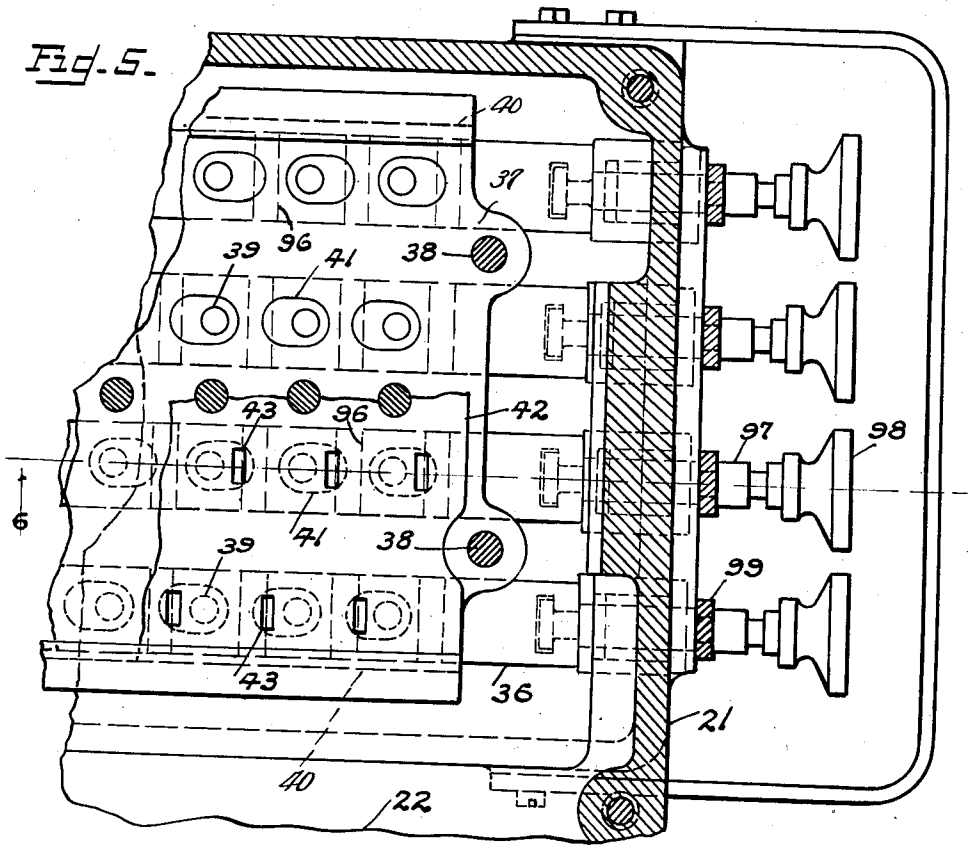
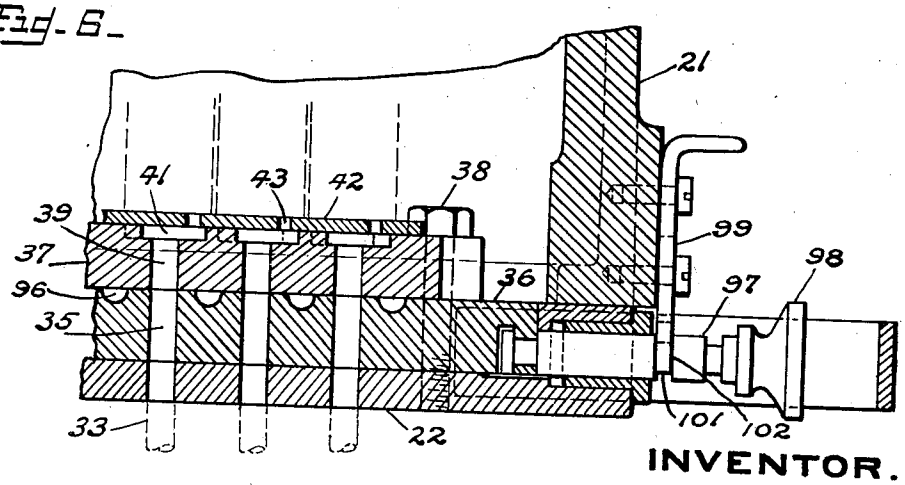


Fig. 6.



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March 30, 1937. E. BUCKINGHAM 2,075,568

INKING MECHANISM FOR ROTARY PRINTING MACHINES

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Fig-7-

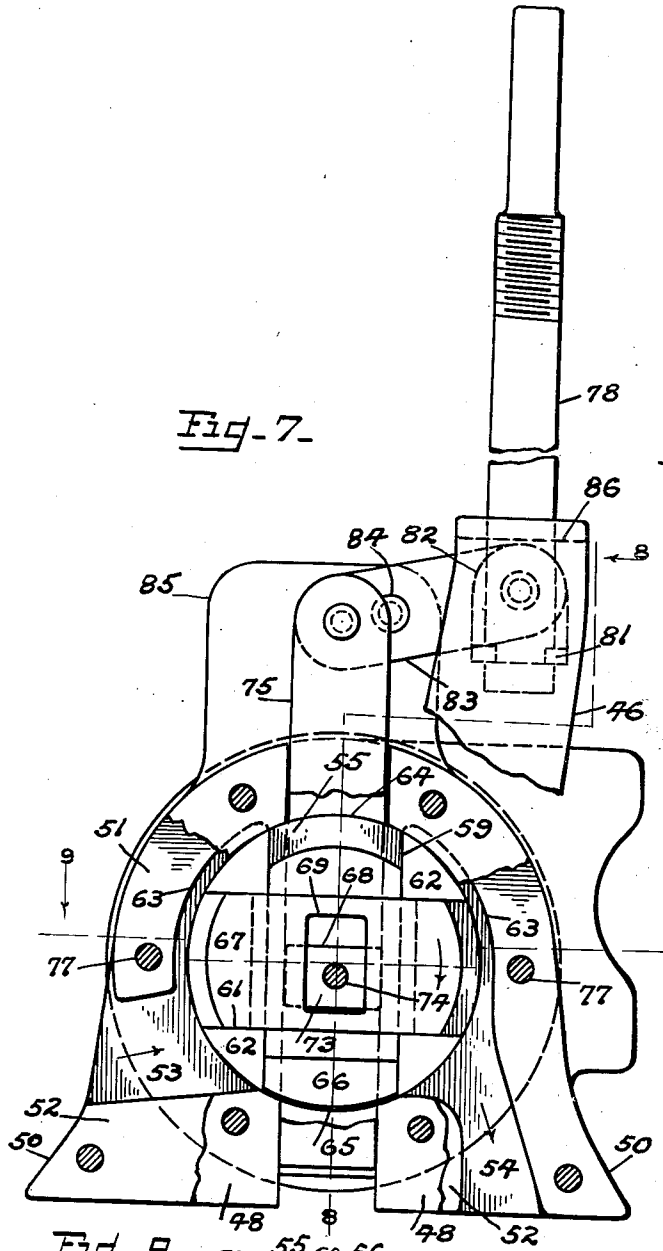


Fig-8-

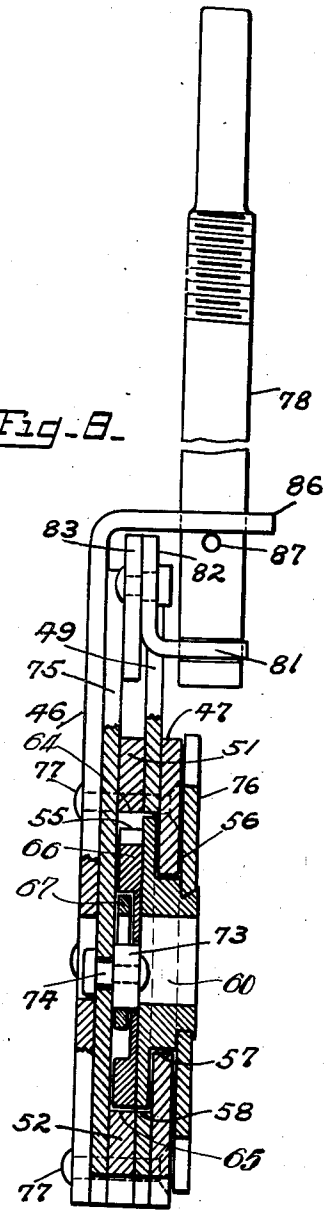
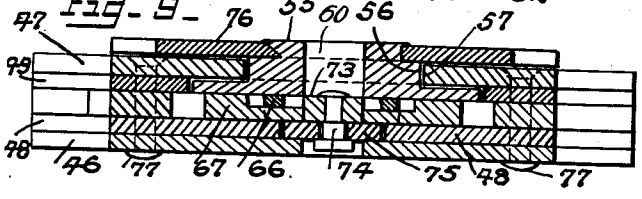


Fig-9-



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March 30, 1937. E. BUCKINGHAM 2,075,568

INKING MECHANISM FOR ROTARY PRINTING MACHINES

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Fig. 10.

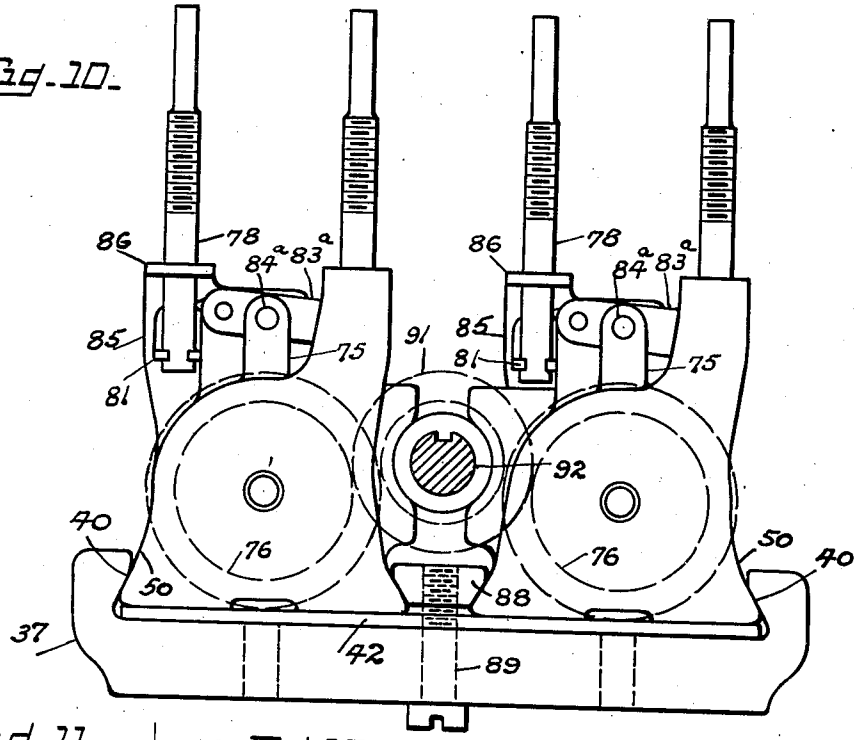


Fig. 11.

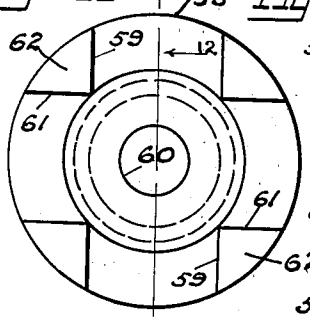


Fig. 12.

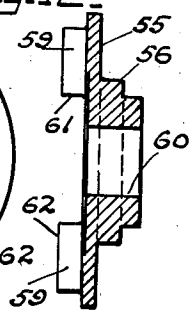


Fig. 13.

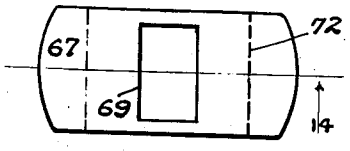


Fig. 14.

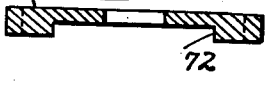


Fig. 15.

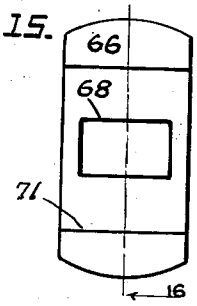
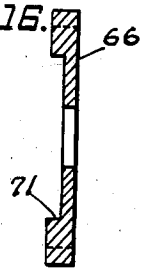


Fig. 16.



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By Albert J. Horton

Atty.

Patented Mar. 30, 1937 2,075,568

UNITED STATES PATENT OFFICE

2,075,568

INKING MECHANISM FOR ROTARY PRINTING MACHINES

Earle Buckingham, Belmont, Mass., assignor, by mesne assignments, to R. Hoe & Co., Inc., New York, N. Y., a corporation of New York

Application March 21, 1934, Serial No. 716,597

23 Claims. (Cl. 101—366)

This invention relates to an improved inking mechanism for newspaper printing machines and more particularly to an improved pump mechanism for use in supplying ink under pressure to the distributing cylinder or other portion of the inking apparatus in continuous regulated quantities, so that the supply of ink to each column or other section of the form may be varied as desired in accordance with the matter to be printed.

The principal object is to provide an individual pump for the supply of each column which will discharge ink in a smooth continuous flow, said pumps being of the rotary type and each being individually adjustable.

A commonly used form of pumping device for discharging ink to the distributing rollers of printing machines, is disclosed in a patent to White No. 1,311,198. Here a single reciprocating piston type of pump is shown which is adapted to draw a measured quantity of ink and discharge same once for each cycle of movement of a crank, the action of which produces a pulsating flow of ink.

In the present invention an improved type of pump has been provided which has four pistons arranged within a rotor in such manner that four measured quantities of ink are discharged during each cycle of the rotor. The flow of ink therefore with this form of pump structure is continuous instead of pulsating. In other words the pulsating action of a single piston pump is smoothed out by the action of the four piston structure to a continuous flow. The structure is arranged further in a very compact order, with each pump constructed as a separate unit and independently removable for replacement or repairs.

With these and other objects not specifically referred to in view, the invention consists in certain novel parts, arrangements and combinations which will be described in connection with the accompanying drawings and the novel features pointed out in the claims hereunto annexed.

Referring to the drawings:

Figure 1 is a plan view of the ink supply reservoir with the cover removed to show the pumping mechanism assembled therein;

Figure 2 is a vertical longitudinal section through the ink reservoir and pumping mechanism.

Figure 3 is a transverse vertical cross section through the ink reservoir taken along the line **3** of Figure 2, and also showing the ink supply valve and float mechanism;

Figure 4 is a vertical cross section taken along the line **4** of Figure 3 through the valve member;

Figure 5 is a fragmentary plan section through a portion of the reservoir taken along the line **5** of Figure 2 with parts broken away;

Figure 6 is a vertical section taken along the line **6** of Figure 5, through certain of the outlet ports and conduits;

Figure 7 is an enlarged elevational view of a pump unit, with parts broken away to clearly show the pump mechanism;

Figure 8 is a partial elevational and central sectional view of the mechanism shown in Figure 7;

Figure 9 is a cross sectional view taken along the line **9** of Figure 7;

Figure 10 is an end elevation, showing two rows of pumps assembled in driving relation with a drive member and looking at pumps which are positioned to the rear of a pair of pumps like that shown in Figure 7;

Figure 11 is a front elevational view of a pump rotor;

Figure 12 is a vertical section taken along the line **12** of Figure 11; and

Figures 13, 14, 15 and 16 are details in elevation and section of the piston members which cooperate with the rotor.

Referring now to the drawings in detail, the reference character **21** (Figure 2) indicates a reservoir casing which is secured to a base **22** and has a cover **23** bolted to the top thereof to provide a sealed closure. As shown in Figure 3, an ink supply enters the casing through a pipe **24**, fixture **25** and a sleeve valve **26**, which sleeve projects into the reservoir. Arms **27** (Figure 4) extending from the outer or rotor sleeve **28** of said sleeve valve are connected with a suitable float **29** and are moved thereby to open or close a number of valve ports **31** within the rotor sleeve **28** and stationary sleeve **32** of the valve. By means of said float and valve mechanism, a constant ink level is maintained within the reservoir.

A multiplicity of conduits or tubes **33** enter the lower face of the base **22** as shown in Figures 3 and 6 and are arranged in four rows as clearly shown in Figure 5, there being one conduit for each column of print of a newspaper page, with each row of conduits corresponding to a full page. The ends of the conduits terminate at grooved portions **34** provided in the base **22** and are adapted to register with holes **35** provided in longitudinally slidable bars **36** when said bars are normally positioned as shown in Figure 6.

A pump supporting plate **37** rests upon the

slidable bars 36, and is secured to the base by means of bolts 38, as indicated in Figures 5 and 6. This plate has holes 39 therein, which register with the holes 35 in slidable bars 36, and has a dove tail slot 40 therethrough. Elongated recesses 41 are also provided in the upper surface of the plate 37, as shown in Figures 5 and 6, for a purpose to be hereinafter explained, and a sealing gasket 42, having slots 43 therethrough, is placed over said plate 37 in the manner shown in Figures 5 and 6.

Referring now to the pump mechanism and particularly to Figures 7 to 16, said mechanism comprises a multiplicity of rotary pump units, one of which is provided for each conduit 33, these units being preferably arranged in a very compact assemblage in the manner shown clearly in Figure 1. In the preferred form, each unit comprises a laminated plate structure, best shown in the enlarged Figures 7 to 9, and formed to provide inlet and discharge ports, the wall structure therefor, bearings for the rotary piston members and a gear drive member. In detail, each unit consists of a front support plate 46 and a rear support plate 47, and adjacent each of these plates are two wall plates, a front wall plate 48 and a rear wall plate 49. Between the wall plates is a two piece plate structure comprising an upper member 51 and a lower member 52, which are spaced apart and are formed to provide an inlet port 53 and a discharge port 54. The front wall plate 48 is divided into two spaced parts to permit an adjustable bar 75 to be vertically movable therebetween. Each of said plates is shaped with an outer contour as shown in Figure 7, the lower ends being flared outward at 50 to provide a means for clamping each unit to the supporting plate 37 in a manner to be hereinafter described.

A rotor 55, shown in detail in Figures 11 and 12, has a hole 60 therethrough and a hub 56 which is rotatably mounted within a bearing 57 provided in the rear support plate 47. An opening 58 is provided in the rear wall plate 49 in which the periphery of the rotor can freely rotate. Said rotor has two diametrically opposed slots 59 and 61 through the face thereof, which slots leave four pads 62 extending from said face into the area embraced by the port plates 51 and 52. As shown in Figure 7, the upper port plate 51 is cut away at 63—63 on each side of the vertical center, but an extended portion 64 of the inner surface thereof is in running engagement with the periphery of the rotor. The lower port plate 52 also has a similar extended portion 65 in running engagement with the periphery of the rotor.

Two piston blocks 66 and 67, shown in Figures 13 to 16, have rectangular openings 68 and 69 and transverse slots 71 and 72 respectively. Said blocks are adapted to be assembled with their slotted faces abutting and there is sufficient clearance in the openings and transverse slots to allow freedom of movement for each piston block in an endwise direction. When assembled, said piston blocks are placed within the slotted rotor face in the position shown in Figure 7. A rectangular sleeve 73, positioned within the rectangular openings, has a pin 74 secured thereto and the pin is rotatably mounted within the vertically adjustable bar 75 in a position which is eccentric to the axis of the rotor 55. (See Figure 7.) The bar 75 is slidable vertically within a channel formed between the adjacent edges of the divided front wall plate 48 and between the front support plate 46 and the port plates 51 and 52.

A gear 76, of the same flat plate structure as that used in the wall plate and support plate structure, is fixed to the rotor 55 and, when driven, provides the means for actuating the pump. Before the gear is secured to the rotor, the entire plate structure, with the rotor assembly therein, is secured together by means of rivets 77 and provides a compact unit.

In practice the pump unit is immersed in an ink chamber, and the ink fills the inlet port 53. The piston blocks are rotated with the rotor in the direction of the arrow and are reciprocated in the slots 59 and 61 by the eccentrically positioned sleeve 73. As the piston blocks move, a charge of ink is received while each end of each piston block is passing the inlet port 53 during one half of a cycle, and will be discharged while passing the discharge port 54. In the position shown in Figure 7 the lower end of the piston block 66, has just completed its discharge stroke, while the end opposite has drawn a full charge into the rotor; and the left end of piston block 67 has taken a half charge while the end opposite has discharged one half of its charge; in other words the piston block 66 is shown in the extreme charge and discharge position while the piston block 67 is shown in a midway position with half a charge at each end.

As herein disclosed, the position of the eccentric sleeve may be adjusted by means of the vertically slidable bar 75, to vary its eccentricity and hence the amount of the ink discharged during each revolution. This adjustment is provided by a rod 78 which is threaded at its upper end and engaged by a nut 79 rotatably mounted in the cover 23 as shown in Figure 3, these nuts all being held in place by a binding plate 79' suitably secured to the cover 23, and are preferably knurled on their upper ends to facilitate operation with fingers. A forked member 81 (Figure 8) engages a slotted lower end of said screw 78 and has a vertically disposed ear 82, which is connected with the upper end of the slidable bar 75 through a link 83 (Figure 7), the link being pivotally mounted at 84 on a lug 85 extending upward from the rear wall plate 49. The lower portion of said screw 78 is guided within an ear 86, projecting from an upward extension of the front support plate 46, and a stop pin 87 is provided in the lower end of the screw below the ear 86 to limit the adjustment in one direction. In this arrangement a downward movement of the screw 78 will lift the bar 75. By means of such an adjustment the position of the eccentric sleeve can be varied to change the volume of the ink flow as desired. When an adjustment is made whereby the sleeve axis is moved into alignment with the rotor axis, both the pistons and the rotor will rotate in a concentric relation and there will be no pumping action. It is thus possible to adjust each pump individually for any volume of discharge from maximum to complete elimination of a pumping action, by means of the adjustable screw 78 and mechanism cooperating therewith. A cover 89, pivotally mounted on the reservoir cover 23, is provided to conceal the adjusting mechanism.

In Figure 1, a battery of pump units is shown assembled in two separate rows with said units grouped in pairs. When arranging said units in pairs, they are placed back to back in a reverse order with the exposed faces of the gears 76 of

each unit abutting. Each pair of units is assembled in this order upon the supporting plate 37 with one of the flared ends of each row of pump casings engaging one of the ends of the dove tailed slot 40 in the supporting plate and with their discharge openings alternately arranged in parallel rows. Means are provided to clamp the pump units in said plate 37, and comprise a number of wedge shaped blocks 88, arranged so that each beveled or wedge face will be wedged between the inner flared ends of the two rows of pump units, said wedging action being provided by bolts 89, which pass through clearance openings in said plate and engage said blocks. Each block is drawn downward and becomes wedged between the flared ends of the pump which thus forces the outer flared ends of the pumps into clamped engagement with the dove tailed slots 40 in the plate 37. The pumps are thus drawn downward against the gasket 42 with the discharge outlet of each pump positioned directly over the corresponding slot 43 in the gasket.

Having assembled the pump units in this manner, a driving mechanism is next provided to rotate the rotor of each pump. This comprises a number of pinions 91 fixed to a drive shaft 92, which shaft is positioned between the two rows of pump assemblies and is rotatably mounted in bearings 93 and 94, secured to the front and rear walls of the pump casing 21, as shown in Figures 1 and 2. Each pinion 91 is adapted to engage and drive the gears 76 of four pumps, due to the grouping of units in pairs with their gear faces abutting and the end to end relation between two rows of units. In the assembly illustrated in Figure 1, a battery of thirty-two pump units are shown arranged in two rows with sixteen units in each row and are driven in groups of four, by eight pinions on the drive shaft 92. Any suitable drive connection may be made between the shaft 92 and the machine, to thereby drive said pumps in timed relation with the machine.

It will be observed that due to the grouping of pump units in pairs, with gear faces abutting the rotors of certain pumps will run in a direction opposite to that indicated in Figure 7, and unless suitable provision is made the flow of ink through these pumps will be in the reverse direction. To compensate for this condition the bar 75 is so arranged that the axis of the eccentrically positioned sleeve 73 which operates each reversed pump, is moved above the rotor axis instead of below as shown in Figure 7, and a modified linkage arrangement is provided to accommodate this change. In Figure 10 the pumps of the reverse position to that of Figure 7 are shown, also the said modified linkage arrangement, which latter comprises a long link 83*a* having one end pivoted at 84*a* to the extension 85, and its opposite end joined to the screw 78 in the same manner as previously described for the link 83. Instead of connecting the bar 75 to the end of the link in the manner shown in Figure 7, it is connected intermediate of the ends of the link, between the pivot 84*a* and the connection with the screw 78. Therefore, with the links 83 and 83*a* arranged as described, the movement of any screw in a stated direction will cause an equivalent movement to be effected in regard to the positions of any of the sleeves 73.

A very compact and efficient pump unit has thus been developed, the structure of which principally comprises a number of flat stamped plates united together into a narrow laminated form of unit, a considerable number of which may be grouped together into a compact assemblage that will occupy but little space.

An arrangement is also provided whereby an entire row of pumps may be made ineffective simultaneously. This is accomplished by moving one of the slide bars 36 inward to bring transverse slots 96, in the upper surface thereof, into alignment with openings 39 in the pump supporting plate 37 and thereby provide a by-pass to return the discharged ink back to the reservoir. Each slide bar 36 has a push rod 97 secured thereto, which is slidable within and extends beyond the reservoir base 22. By means of a knob 98 at the outer end of the push rod, the said rod can be pushed inward to discontinue the ink discharge through one row of conduits or pulled outward to continue the normal feed. A locking member 99, slidably mounted on the wall of the casing 21, is provided for each push rod 97 and has a forked end 101 which is adaped to engage one of two grooves 102 in said rod to positively fix the position of same in either a normal discharge or by-pass position.

After the entire pumping mechanism is assembled within the reservoir, ink is supplied through the supply pipe 24 and raises to a level considerably above the inlet port 53 at which level it is constantly maintained by the float 29. The pump inlet ports are thus always completely submerged within the ink, and each pump cylinder is adapted to receive its supply on the intake stroke of the piston as it passes through the ink and force same through the discharge outlet 54 to the conduits 33, after passing the extended portion 64 of the upper port plate 51, or portion 65 of the lower port plate 52, depending upon the direction of rotation.

It is to be particularly noted that with the pump structure shown, the equivalent of a four cylinder pump has been provided which by reason of its four strokes per cycle, is adapted to develop a continuous non-pulsating flow and in addition to this feature a separate pump is provided for each conduit. With this arrangement a more satisfactory ink distribution can be provided to the inking cylinder and fewer ink distributing rollers are required to distribute the ink.

It will be further noted that the piston displacement of each pump is individually adjustable from a point outside of the reservoir and that such adjustment will cover a range from maximum volume to complete elimination of the discharge through the conduit.

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 appended claims rather than to the foregoing description to indicate the scope of the invention.

What I claim is:

1. In an ink pumping mechanism for a printing machine, an ink reservoir, a plurality of individual rotary pumps, each pump comprising a casing having inlet and discharge ports therein, a rotor within said casing, a gear connected therewith and positioned on the outside of the casing, pistons cooperating with said rotor, a supporting base having four rows of openings therein, said

pump casings being grouped in pairs with gear faces abutting and being arranged in two rows upon said base with alternate discharge openings in each row of pumps in alignment with their respective openings in the base, means for clamping said pump casings to the base with discharge openings and base openings in alignment, means for securing the base within the reservoir, and a drive shaft rotatably mounted between said rows of pump casings with pinions thereon arranged in mesh with the abutting rotor gears of two pairs of pumps.

2. In an ink pumping mechanism for a printing machine, an ink reservoir, a plurality of individual rotary pumps, each pump comprising a casing having an inlet and a discharge port therein, a rotor within said casing, a gear connected therewith, pistons movable within said rotor, a pump supporting base having a number of rows of openings therein, slide bars having openings therein to register with said pump supporting base openings and slidable within grooves in the reservoir base in alignment with the openings in the pump supporting base, said pump casings being secured to said supporting base with discharge ports in alignment with the supporting base openings and said supporting base being secured over the slide bars, a drive connected with said rotor gears and actuated in a timed relation to the printing machine, means for adjusting the volume of the ink discharge, and means for adjusting the position of the slidable bars, whereby the discharge through one or more rows of openings in said pump supporting base may be by-passed back to the reservoir.

3. In an inking mechanism for a printing machine, an ink reservoir, rotary ink pumps arranged in two parallel rows within said reservoir, each pump including a compact casing with rotor operated piston members therein, a gear rotatable with the rotor and positioned outside of the pump casing, the casings of the pumps in each row being arranged in pairs with their gears adjacent, and a drive shaft having pinions thereon and mounted between the two rows of pumps with each pinion engaging the two adjacent gears at each side thereof, whereby a multiplicity of pumps may be arranged within a comparatively small space.

4. In a printing machine, an inking mechanism including an ink reservoir and means to receive ink from said reservoir and distribute it at a plurality of points on an ink receiving part of said machine in a constant and even manner, said means including a plurality of pumps, each of said pumps having a driving gear, said pumps being arranged in said reservoir in pairs with the driving gear of one of each pair juxtaposed with the driving gear of the other, and common means driven in synchronism with said machine for driving said pairs of pumps simultaneously, each of said pumps being of the rotary type adapted to provide a continuous discharge flow therefrom.

5. In a printing machine, an inking mechanism including an ink reservoir and means to receive ink from said reservoir and distribute it at a plurality of points on an ink receiving part of said machine in a constant and even manner, said means including a plurality of pumps, each of said pumps having a driving gear, said pumps being arranged in said reservoir in a plurality of rows with the pumps in each row arranged in pairs with the driving gear of one of each pair juxtaposed with the driving gear of the other, and common means extending between the rows of pumps in driving engagement with the juxtaposed gears of each pair of pumps in adjacent rows, to simultaneously drive said pumps.

6. In a printing machine, an inking mechanism including an ink reservoir and means to receive ink from said reservoir and distribute it at a plurality of points on an ink receiving part of said machine in a constant and even manner, said means including a plurality of pumps, each of said pumps having a driving gear, said pumps being arranged in said reservoir in a plurality of rows with the pumps in each row arranged in pairs with the driving gear of one of each pair juxtaposed with the driving gear of the other, common means extending between the rows of pumps in driving engagement with the juxtaposed gears of each pair of pumps in adjacent rows, to simultaneously drive said pumps, each of said pumps having a discharge outlet, said reservoir having an outlet corresponding to each pump outlet, means between the outlets of one row of said pump and the reservoir outlets corresponding therewith operable to vary the flow from said reservoir outlets, said pumps being of the multiple rotary piston type adapted to provide a continuous discharge flow therefrom and having means associated therewith to vary the rate of discharge flow therefrom.

7. In a printing machine, an inking mechanism including an ink reservoir and means to receive ink from said reservoir and distribute it at a plurality of points on an ink receiving part of said machine in a constant and even manner, said means including a plurality of pumps, each of said pumps having a driving gear, said pumps being arranged in said reservoir in pairs with the driving gear of one of each pair juxtaposed with the driving gear of the other, common means driven in synchronism with said machine for driving said pairs of pumps simultaneously, means to secure each pump of each pair to said reservoir to permit its individual removal therefrom, each of said pumps being of the rotary type adapted to provide a continuous discharge flow therefrom.

8. In a printing machine, an inking mechanism including an ink reservoir and means to receive ink from said reservoir and distribute it at a plurality of points on an ink receiving part of said machine in a constant and even manner, said means including a plurality of pumps, each of said pumps having a driving gear, said pumps being arranged in said reservoir, in a plurality of rows with the pumps in each row arranged in pairs with the driving gear of one of each pair juxtaposed with the driving gear of the other, common means extending between the rows of pumps in driving engagement with the juxtaposed gears of each pair of pumps in adjacent rows, to simultaneously drive said pumps, each of said pumps having a discharge outlet, said reservoir having an outlet corresponding to each pump outlet, means between the outlets of one row of said pumps and the reservoir outlets corresponding therewith, operable to vary the flow from said reservoir outlets, means to secure each pump of each pair to said reservoir to permit its individual removal therefrom, said pumps being of the multiple rotary piston type adapted to provide a continuous discharge flow therefrom and having means associated therewith to vary the rate of discharge flow therefrom.

9. The combination with a printing machine having printing cylinders, ink distributing roll-

ers, an ink distributing member coextensive with the printing cylinders and ink distributing rollers, of an ink reservoir, a plurality of conduits communicating with the ink distributing member at spaced points throughout its effective length, a plurality of closely nested rotary variable displacement ink pumps operably interposed between the reservoir and the conduits, a separate pump operably communicating with each conduit to supply a constant and even flow of ink to the ink distributing member to permit the ink distributing member to supply ink in a uniform film to the ink distributing rollers thereby supplying a uniform film of ink to the printing cylinders with the employment of a minimum number of ink distributing rollers.

10. The combination with a printing machine having printing cylinders, ink distributing rollers, an ink distributing member coextensive with the printing cylinders and ink distributing rollers, of an ink reservoir, a plurality of conduits communicating with the ink distributing member at spaced points throughout its effective length, a plurality of closely nested rotary variable displacement ink pumps operably interposed between the reservoir and the conduits and driven in timed relation with the printing machine, a separate pump operably communicating with each conduit to supply a constant and even flow of ink to the ink distributing member to permit the ink distributing member to supply ink in a uniform film to the ink distributing rollers thereby supplying a uniform film of ink to the printing cylinders with the employment of a minimum number of ink distributing rollers.

11. The combination with a printing machine for printing separate pages having separate columns, and including printing cylinders, ink distributing rollers and an ink distributing member coextensive with the printing cylinders and ink distributing rollers, of an ink reservoir, a plurality of conduits communicating with the ink distributing member at spaced points throughout its effective length, there being one conduit for each column, a plurality of closely nested rotary variable displacement ink pumps operably interposed between the reservoir and the conduit so that a separate pump is operably communicated with each conduit to supply a constant and even flow of ink to the ink distributing member so that the ink distributing member supplies ink in a uniform film to the ink distributing rollers thereby supplying a uniform film of ink to the printing cylinder with the employment of a minimum number of ink distributing rollers.

12. The combination with a printing machine for printing separate pages having separate columns and including printing cylinders, ink distributing rollers and an ink distributing member coextensive with the printing cylinders and ink distributing rollers, of an ink reservoir, a plurality of conduits communicating with the ink distributing member at spaced points throughout its effective length, there being one conduit for each column, a plurality of closely nested rotary variable displacement ink pumps operably interposed between the reservoir and the conduit so that a separate pump is operably communicated with each conduit to supply a constant and even flow of ink to the ink distributing member so that the ink distributing member supplies ink in a uniform film to the ink distributing rollers thereby supplying a uniform film of ink to the printing cylinder with the employment of a minimum number of ink distributing rollers, and means for separately regulating the quantity of ink discharged by each pump.

13. In an inking mechanism for a printing machine having printing cylinders, ink distributing rollers and an ink distributing member, an ink reservoir, a plurality of closely nested rotary pumps operably interposed between the reservoir and the ink distributing member to pump ink from the reservoir to the ink distributing member, each pump comprising a rotor, a plurality of variable displacement pistons slidable within said rotor, each piston being equally movable to receive and discharge equal charges of ink so that a continuous and uniform flow of ink is delivered to the ink distributing member to permit the ink distributing member to supply ink in a uniform film to the ink distributing rollers thereby supplying a uniform film of ink to the printing cylinders with the employment of a minimum number of ink distributing rollers, and a drive for said rotors.

14. In an inking mechanism for a printing machine having printing cylinders, ink distributing rollers and an ink distributing member, an ink reservoir, a plurality of closely nested rotary pumps operably interposed between the reservoir and the ink distributing member to pump ink from the reservoir to the ink distributing member, each pump comprising a rotor, a plurality of pistons slidable within said rotor, each piston being equally movable to receive and discharge equal charges of ink so that a continuous and uniform flow of ink is delivered to the ink distributing member to permit the ink distributing member to supply ink in a uniform film to the ink distributing rollers thereby supplying a uniform film of ink to the printing cylinders with the employment of a minimum number of ink distributing rollers, a drive for said rotors, and means to adjust the operable pumping stroke of the pistons of each rotor.

15. In an inking mechanism for a printing machine, an ink reservoir, a pumping unit including a plurality of closely nested rotary ink pumps arranged in pairs, each pump comprising a rotor having a plurality of pistons movable therein, each piston being equally movable to receive ink from the reservoir and discharge it to the ink receiving apparatus of the printing machine, a drive shaft, a plurality of drive pinions on said shaft, a gear operably secured to each rotor of each pump and located so that the two gears of a pair of pumps mesh with a single drive pinion.

16. In an inking mechanism for a printing machine, an ink reservoir, a pumping unit including a plurality of closely nested rotary ink pumps arranged in pairs, each pump comprising a rotor having a plurality of pistons movable therein, each piston being equally movable to receive ink from the reservoir and discharge it to the ink receiving apparatus of the printing machine, a drive shaft, a plurality of drive pinions on said shaft, a gear operably secured to each rotor of each pump and located so that the two gears of a pair of pumps mesh with a single drive pinion, and means to independently regulate the stroke of the pistons in each rotor.

17. In an inking mechanism for a printing machine, an ink reservoir, a pumping unit including a plurality of closely nested rotary ink pumps arranged in pairs, and two rows of pairs,

a drive shaft operably mounted between the two rows, drive pinions carried by the drive shaft, there being a drive pinion for two pairs of pumps, a rotor within each pump, pumping means carried by each rotor, a gear operably secured to each rotor of each pump and arranged so that the gears of two pairs of pumps mesh with a single drive pinion so that each pinion drives four pumps.

18. In an inking mechanism for a printing machine, an ink reservoir, a pumping unit including a plurality of closely nested rotary ink pumps arranged in pairs, and two rows of pairs, a drive shaft operably mounted between the two rows, drive pinions carried by the drive shaft, there being a drive pinion for two pairs of pumps, a rotor within each pump, pumping means carried by each rotor, a gear operably secured to the rotor of each pump and arranged so that the gears of two pairs of pumps mesh with a single drive pinion so that each pinion drives four pumps, and means for independently varying the quantity of ink pumped by each pump.

19. The combination with a printing machine having printing cylinders, ink distributing rollers and an ink distributing member coextensive with the printing cylinders and ink distributing rollers, of an ink reservoir, a group of closely nested rotary variable displacement ink pumps positioned within said reservoir and operably interposed between the reservoir and the ink distributing member, said pumps being independently driven by a member running in synchronism with the printing machine and being independently adjustable to vary the displacement of each pump to vary the quantity of ink discharged from each pump, the pumps operating to supply a constant and even flow of ink to the ink distributing member to permit the ink distributing member to supply ink in a uniform film to the ink distributing rollers thereby supplying a uniform film of ink to the printing cylinders with the employment of a minimum number of ink distributing rollers.

20. In an inking mechanism for a printing machine, an ink reservoir communicating with a plurality of closely nested variable displacement constant flow rotary pumps driven in synchronism with the machine, each pump being adapted to supply ink to a limited area of a printing plate carried by the machine and including means for separately varying the displacement of each pump to regulate the quantity of ink supplied to the plate while maintaining the ink flow constant and uniform and proportionate to the speed of the machine, all of said varying means being grouped for convenient manipulation.

21. In an inking mechanism for a printing machine, an ink reservoir, a plurality of ink pumps, a frame member in said reservoir and having a pump engaging member, and a releasable member engaging each pump to force the pump into engagement with the said pump engaging member of the frame thereby securing the pump to the frame.

22. In an inking mechanism for a printing machine, an ink reservoir, a frame member in said reservoir and having a pump engaging member, a plurality of pumps arranged in a row on said frame, and a plurality of releasable members engaging the pumps to force them into engagement with the pump engaging member of the frame to thereby secure the pumps in a row to the frame.

23. In an inking mechanism for a printing machine, an ink reservoir, a frame member in said reservoir and having opposed pump engaging members, a plurality of pumps arranged in opposing rows in pairs on the frame and a plurality of releasable members, each releasable member engaging each pair of adjacent and opposed pumps to force them into engagement with the pump engaging members of the frame to thereby secure the pump to the frame.

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