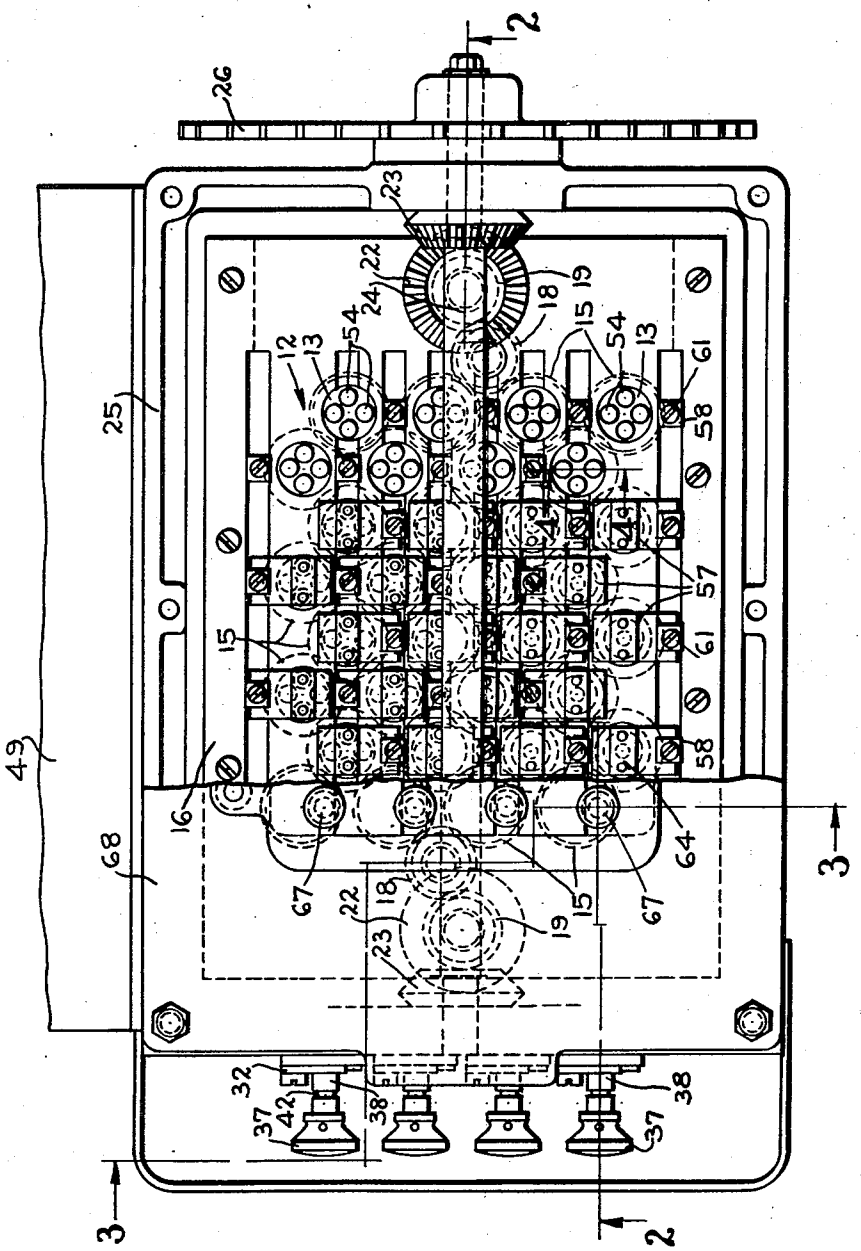
May 6, 1947. W. F. HUCK 2,420,080

INKING MECHANISM FOR PRINTING MACHINES

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Fig. 1.



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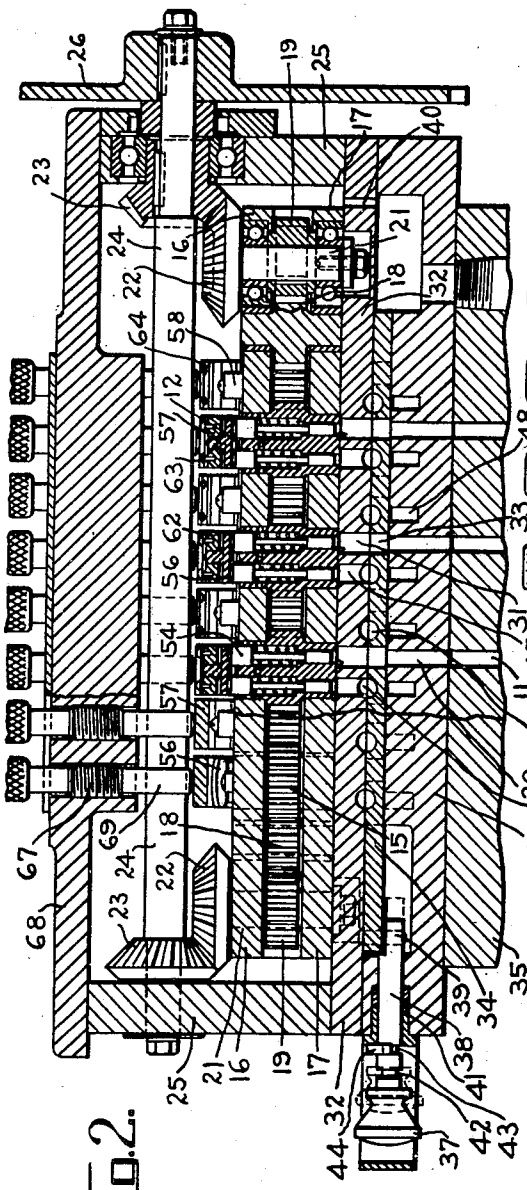


Fig. 2.

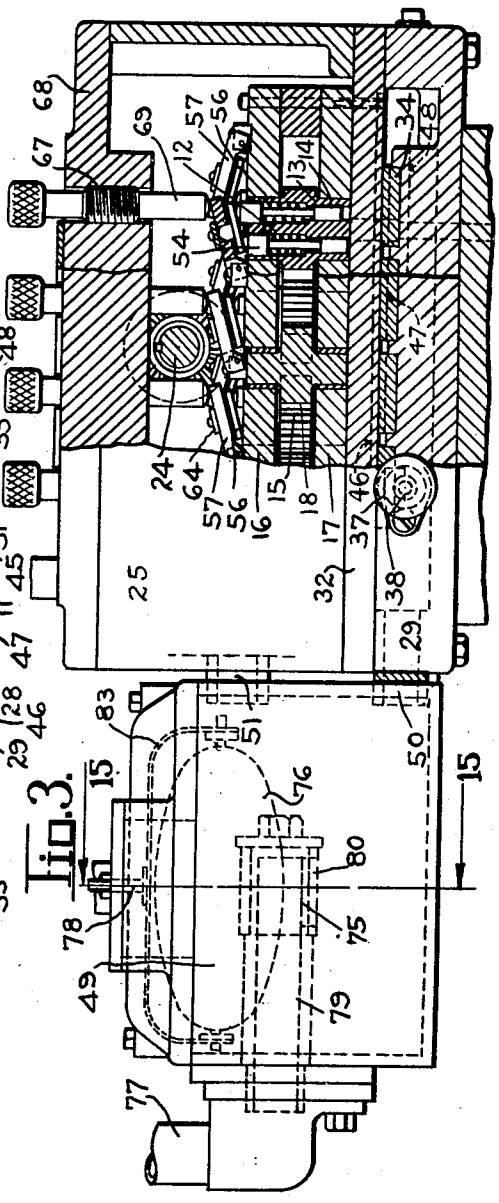


Fig. 3.

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INKING MECHANISM FOR PRINTING MACHINES

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Fig.4.

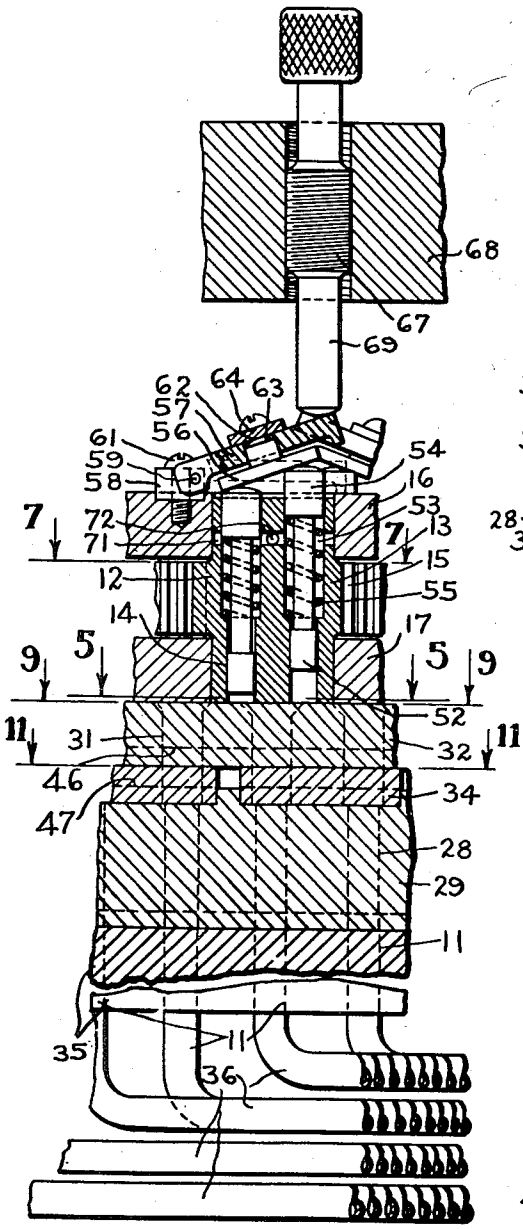


Fig.5.

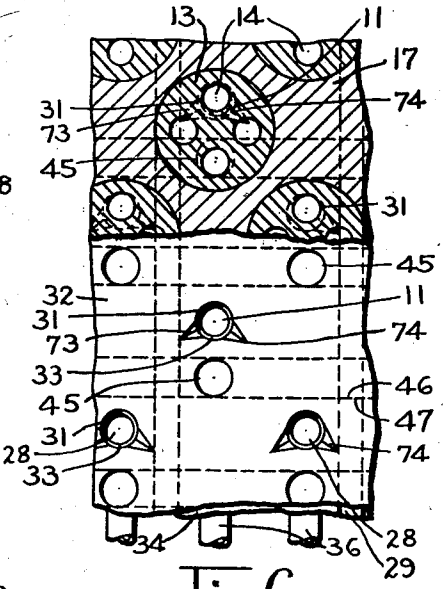
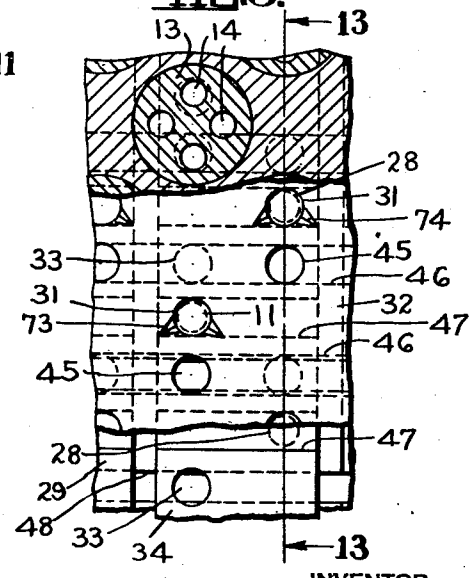


Fig.6.



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INKING MECHANISM FOR PRINTING MACHINES

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Fig. 7.

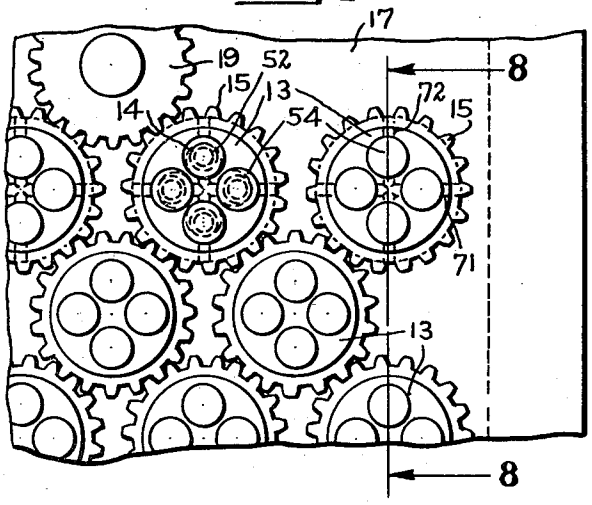


Fig. 8.

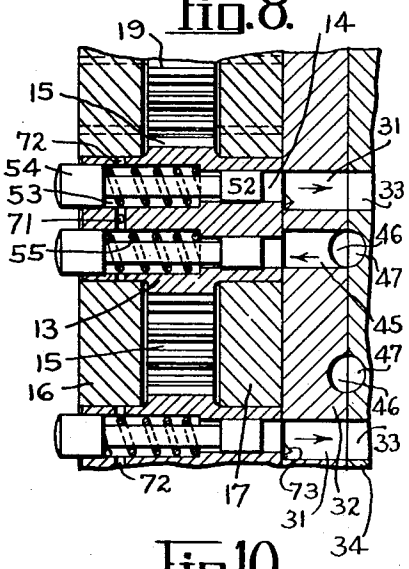


Fig. 9.

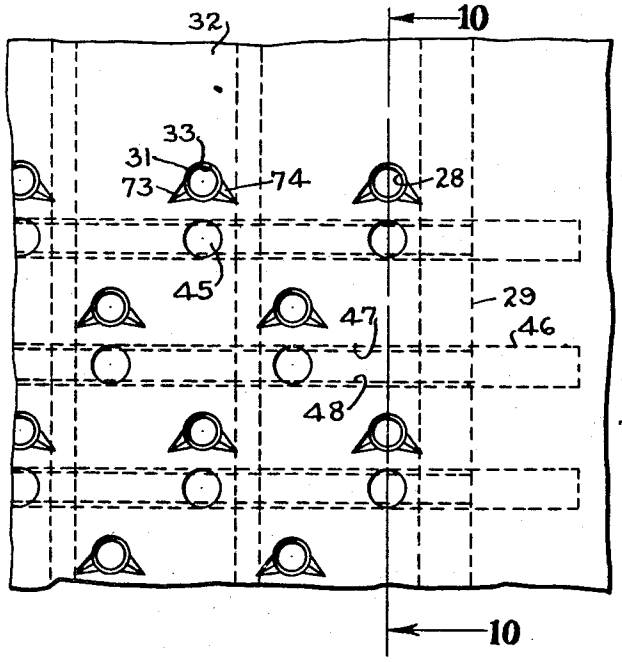
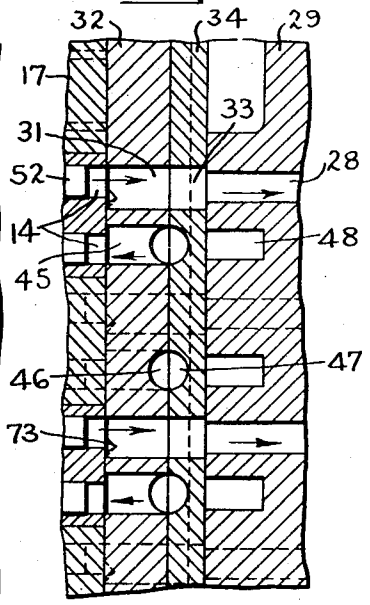


Fig. 10.



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INKING MECHANISM FOR PRINTING MACHINES

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Fig. 11.

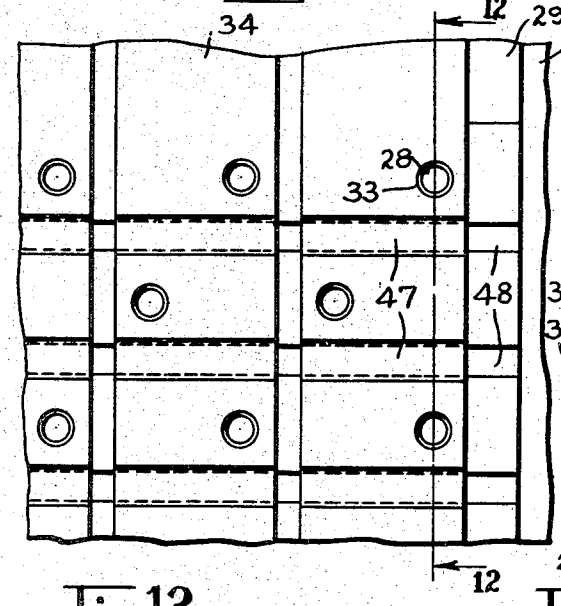


Fig. 12.

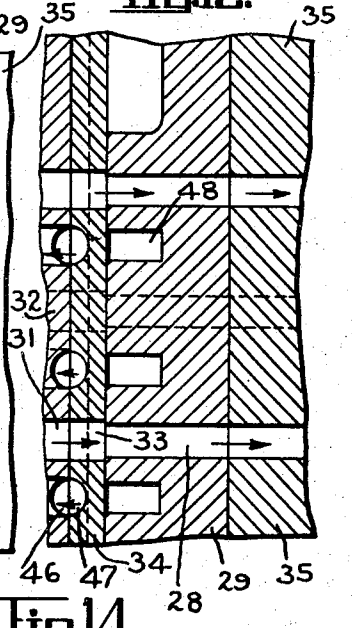


Fig. 13.

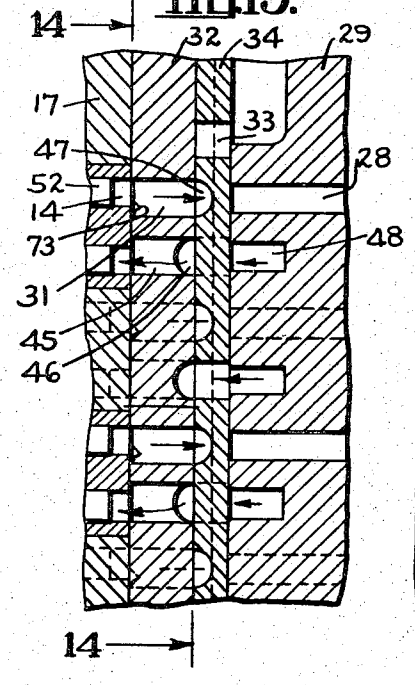
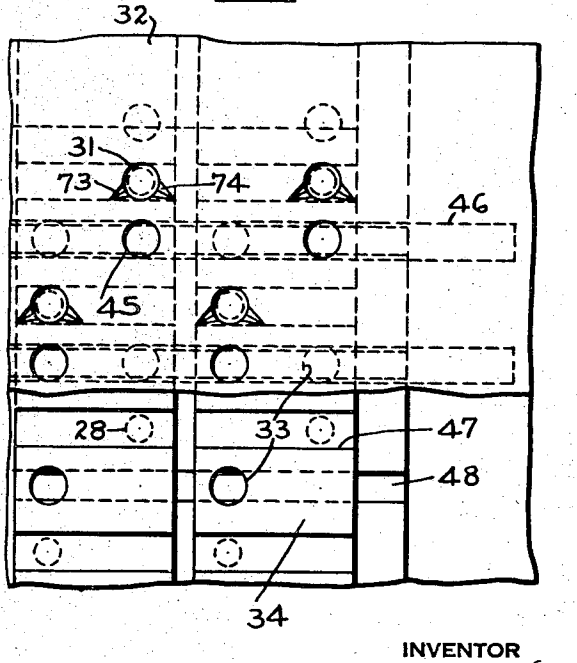


Fig. 14.



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INKING MECHANISM FOR PRINTING MACHINES

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Fig. 15.

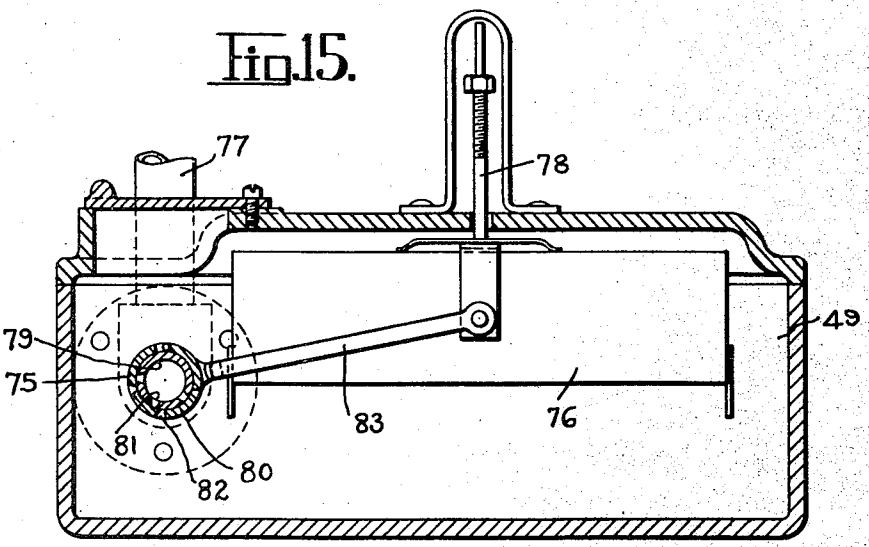


Fig. 16.

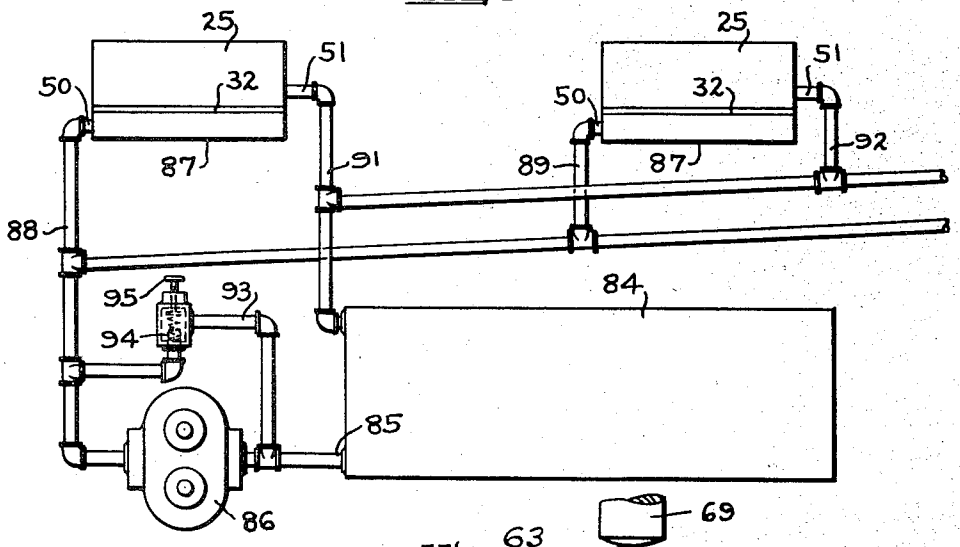
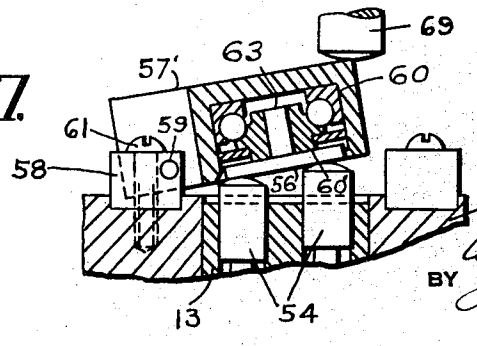


Fig. 17.



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Patented May 6, 1947 2,420,080

UNITED STATES PATENT OFFICE

2,420,080

INKING MECHANISM FOR PRINTING MACHINES

William F. Huck, Richmond Hill, N. Y., assignor to R. Hoe & Co., Inc., New York, N. Y., a corporation of New York

Application March 24, 1942, Serial No. 435,994

13 Claims. (Cl. 103—38)

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This invention relates to inking mechanism for printing machines and more particularly to an improved device comprising a plurality of multiple cylinder rotary ink pumps for use in supplying ink under pressure, to the ink distributing members of a printing machine in a continuous flow regulated in accordance with the requirements of the work.

In inking mechanism of this nature it is common practice to provide a separate pump to supply ink to each of various sections of the form being printed, as for instance to each column of a newspaper.

One object of this invention is to provide an improved pump having a plurality of reciprocating pistons for each section of the form to be printed and wherein the pistons are actuated in sequence to effect a substantially continuous flow and pressure of ink at the delivery point for each pump.

Another object is to provide in an inking mechanism a plurality of multiple cylinder pumps, each being adapted to supply a substantially continuous flow of ink to a separate section or selected area of the form to be printed and wherein the cylinders are formed in a common housing and means is provided to rotate the housing and thereby cause reciprocation of pistons in the cylinders.

A further object of this invention is to provide in an ink feeding device adapted to be connected by means of ducts to separate and selected areas of the form to be printed, a plurality of ink pumps each having a plurality of pump cylinders arranged in parallel relation and a rotary valve device whereby the pump cylinders are successively connected to an intake port in communication with a supply of ink and then to an outlet port connected with a selected area of the form, through one of the ducts.

A still further object is to provide in an ink feeding device including separate pumps for supplying ink to ducts connected to selected areas of a form to be printed, means to maintain a determined and constant pressure upon the supply of ink from which the pumps draw ink, to insure efficient operation of the ink feeding device.

It is also an object of this invention to provide an inking mechanism of generally improved form and construction, whereby its component parts 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,

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that will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed.

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

Figure 1 is a top plan view of an ink feeding or supplying device comprising an assemblage of ink pumps arranged in a casing, with actuating means adapting them for the inking mechanism of a printing machine, the cover for the casing being broken away and certain of the parts being omitted to clearly show the arrangement and form of the parts;

Figure 2 is a sectional view of the device shown in Figure 1, generally along the offset line 2—2 of that figure;

Figure 3 is a sectional view as seen along the offset line 3—3 of Figure 1, and in addition shows an ink level maintaining means;

Figure 4 is an enlarged vertical section as seen on the line 4—4 of Figure 1 through one of the ink pumps;

Figure 5 is a fragmentary sectional view partly on the line 5—5 of Figure 4, the lower portion being a plan view of a plate that is directly below the pump housings and upon which they bear;

Figure 6 is a view similar to Figure 5 but showing the relation of certain parts, when a plurality of the pumps are simultaneously silenced by means of a slidable valve, when paper of less than full width is to be printed;

Figure 7 is a fragmentary plan view showing several of the pumps as seen on the line 7—7 of Figure 4;

Figure 8 is a fragmentary sectional view on the line 8—8 of Figure 7;

Figure 9 is a fragmentary plan view of a plate containing the intake and outlet ports as seen in the direction of arrows 9—9 of Figure 4;

Figure 10 is a sectional view on the line 10—10 of Figure 9;

Figure 11 is a fragmentary top view of the slidable valve bars as seen in the direction of arrows 11—11 of Figure 4;

Figure 12 is a fragmentary sectional view as seen on the line 12—12 of Figure 11;

Figure 13 is a fragmentary sectional view as seen on the line 13—13 of Figure 6;

Figure 14 is a fragmentary plan view of the parts shown in Figure 13 as seen in the direction of arrows and along the broken line 14—14 of Figure 13;

Figure 15 is a sectional view of an ink level

maintaining means for the ink feeding device of this invention, and taken on the line 16—16 of Figure 3;

Figure 16 is a schematic layout of means to maintain a determined and constant pressure on the supply of ink from which the pumps of a plurality of ink feeding devices draw ink; and

Figure 17 is an enlarged sectional view of the upper portion of one of the pumps, showing a piston operating member arranged with an anti-friction bearing.

It is to be understood that each of the pump outlets of this device, there being thirty-two as herein shown, is connected by suitable means, such as by a tube to a nozzle or other suitable terminal, disposed to direct ink onto an ink distributing means, such as a cylinder, over the required or selected area to provide ink to a section of the form to be printed. Such means whereby ink is delivered to an ink distributing cylinder is well known and one form is fully disclosed in a patent to White No. 1,311,198.

As herein shown pump outlets 11 (Figures 2 and 4) are arranged in four rows of eight each arranged in staggered relation, and from these ink is pumped through tubes 36 to a suitable ink distributing cylinder (not shown), from which it is carried to plates on a printing cylinder (not shown) but which is arranged to print four pages of eight columns each of a newspaper. Each of the ducts is arranged to receive ink from a multiple piston pump 12 (Figures 2, 3 and 4). Means are provided—to actuate all of the pumps 12 in unison from a common drive shaft—to shut off the flow of ink from sets of eight thereof, and to vary the quantity of ink supplied by any of the thirty-two pumps.

Each of the pumps 12 includes a cylindrical housing 13 (Figure 4) in which as herein shown, four pump cylinders 14 (Figure 5) are arranged. It will be understood however, that each pump may be arranged with a greater or lesser number of cylinders if desired. Each housing is provided with gear teeth 15 (Figures 4 and 7) on its periphery intermediate its ends. These thirty-two pump housings 13 are preferably disposed with their gear teeth in mesh and are journaled in and between upper and lower gear bearing plates 16 and 17 respectively. The pump housings 13 are arranged in groups of four (Figure 1) across, and also in groups of four lengthwise of the plates 16 and 17, the groups being staggered to effect proper meshing of the gear teeth 15 (Figure 7). Pinions 18 (Figure 2) are rotatably supported between the plates 16 and 17, and are in mesh with the teeth of the middle two of the adjacent transverse groups of four pumps. These pinions are also in mesh with gears 19 keyed to shafts 21 journaled in the plates 16 and 17, each having a bevel gear 22 suitably secured thereon. The bevel gears 22 are each in mesh with a bevel gear 23 keyed to a shaft 24 extending over and lengthwise of the upper plate 16 and passing through a casing 25, which is provided to enclose the pumps and to contain a supply of ink. Preferably a sprocket 26 is keyed to an end of the shaft 24 extending from the casing 25, and is driven by a chain (not shown) from a sprocket on a suitable rotating part of the printing machine.

The outlets 11 are connected to the pumps 12 by suitable passageways 28 (Figure 2) provided in and passing through a bottom plate 29 of the casing 25, and are arranged to connect with outlet ports 31, provided in a pump housing port plate 32, through passageways 33 provided in slidable bars 34, each of which constitutes a multiple valve. In the arrangement shown, four valve bars 34 (Figures 4 and 10) are provided, one for each page to be printed, and each valve bar has eight passageways 33. Sliding a valve bar 34 to the position shown in Figure 13, will misalign the passageways 33 with respect to the outlet ports 31 and the passageways 28, and interrupt the flow of ink from the eight pumps feeding ink to the portion of the printing cylinder that prints a particular page. As herein shown, the casing 25 is seated upon a base 35 (Figure 2) in which the outlets 11 are formed, and from which tubes 36 (Figure 4) lead to terminals in an ink distributing rail, preferably such as is shown in Patent No. 1,589,148.

The valve bars 34 are arranged to be actuated by means of knobs 37 (Figures 1 and 2), one knob being secured to each bar 34 through a rod 38 pinned at its outer end to the respective knob, and at its inner end to the bar 34 by a pin 39. The rod 38 passes through a suitable stuffing box 41 in the end of the casing 25 and has spaced apart grooves 42 and 43 provided therein to receive a latch 44 to lock the rod 38 in either its in or its out position. The arrangement shown is such that when the rod 38 is pulled to its outer extreme, the outlet ports 31 and the passageways 28 are connected through the passageways 33 in the valve bar 34 (Figures 10, 11 and 12).

The pump port plate 32 is also provided with intake ports 45 (Figures 9 and 10), one for each pump. These intake ports 45 are connected to the interior of the casing 25 through grooves 46 (Figures 3 and 10) extending transversely across the plate 32. Matching grooves 47 formed in the valve bars 34 cooperate with the grooves 46, when the bars 34 are in ink passing position, to form passageways through which ink is drawn into the pumps. The bottom plate 29 of the casing 25 has transverse grooves 48 which extend across it to provide channels through which ink may reach the spaces between the bars 34, whence it can flow freely to the grooves 46 and 47 and thence to the pumps.

When a valve bar 34 is pushed in to interrupt the flow of ink to a portion of the machine, as explained above, ink from the grooves 48 is drawn through the space between the valve bars 34 (Figure 2), and through grooves 46 (Figure 13) and ports 45 to the pump cylinders. It is forced out of the pumps through the outlet ports 31 into the transverse grooves 47 in the valve bars 34 and thus back to the spaces between the valve bars 34 and to the grooves 46 from whence it came. With a bypass thus provided, no appreciable back pressure is developed to act against the pump driving means. The interior of the casing 25 is connected to a reservoir 49 (Figures 3 and 15) by an inlet pipe 50, and an overflow pipe 51, the latter serving to maintain ink in the casing 25 at the desired level. A bleeder port 40 (Figure 2) is provided in the port plate 32, to permit ink to pass the port plate 32 and fill the casing.

Referring now more particularly to Figures 4, 5 and 7, the pumps 12 include the housings 13 each having preferably four pump cylinders 14. It will be noted that the lower end of the housing 13 seats tightly upon the port plate 32, and that a piston 52 is reciprocably mounted in each cylinder. Above each of the cylinders 14 an enlarged bore is formed in which an enlarged upper piston end 54 reciprocates. A spring 55

reacting between this piston end 54 and the housing 13 at the bottom of the bore 53 urges the piston 52 upwardly to draw ink into the cylinder 14 through the inlet port 45 in the pump port plate 32 and presses the housing downwardly upon the port plate 32 maintaining a tight joint.

As the pistons 52 rotate with the housings 13, they are pressed down in sequence by means of rotatably mounted discs 56 (Figure 4), carried by pivotally mounted plates 57 each hinged at one of its ends to a block 58 by a pin 59, the blocks 58 being secured to the upper plate 16 by screws 61. As shown in Figure 4, a rounded end 62 is formed on the upper extremity of a stud 63 extending from the disc 56, and this rides on the underside of a strap 64 secured to the hinged plate 57.

In Figure 17 an enlarged view of a preferred arrangement for supporting the disc 56 is shown. In this arrangement, the pivotally mounted plate 57' is arranged to receive a ball bearing having an outer race 60, and an inner race 60', the latter being fitted on the stud portion 63 of the disc 56, which is thus securely though rotatably held in position.

The angular disposition of the disc 56 in respect to the enlarged upper ends 54 of the pistons governs the length of the stroke of the pistons 52. A manually operable adjusting screw 67 (Figure 4) is provided for each pump, and is screw threaded in a casing cover 68 and has a downwardly extended shank 69 adapted to engage the outer end of the plate 57, to adjust the angularity thereof and thus vary the stroke of the pump. An adjusting screw 67 is provided for each pump whereby the quantity of ink supplied by each pump can be varied in accordance with the requirements of the work being printed.

As shown in Figure 4, the left hand piston 52 is down and about to be raised by the spring 55, to draw ink through the inlet port 45 in the port plate 32 (Figures 5 and 8) and into the cylinder 14. The right hand piston 52 is up and about to be pressed down by the disc 56 to force ink out of its cylinder 14 through the outlet port 31 in the port plate 32 and thence to the corresponding outlet 11 through the passageways 33 (Figure 10). To facilitate the flow of ink from the cylinder 14 by the downward movement of the pistons 52, each of the outlet ports 31 in the port plate 32 is provided with V-shaped grooves 73 and 74 leading from the upper face of the port plate 32 downwardly into the respective port 31 (Figures 5 and 9). These V-shaped grooves are arranged one at either side of each port 31 and approximately tangent to the arc of rotation of the axes of the cylinders 14.

In order to avoid the development of back pressure in the pump bores 53 between the enlarged piston head 54 and the piston 52, these bores are interconnected by cross holes or vents 71 and 72 (Figures 4 and 8) drilled at right angles to each other through the portion of the housing 13 journaled in the upper bearing plate 16. By this arrangement any ink which may have become trapped in a bore 53 will flow through one of the cross holes 71 or 72 into the opposite bore when the respective piston 52 is forced down.

A well known means for maintaining a determined level of ink in the reservoir 49 is employed and includes a cylindrical valve 75 (Figures 3 and 15) actuated by a float 76, ink being fed from a supply of ink to the valve 75 by gravity through a pipe 77. An ink level indicating device 78 is attached to the float 76. The valve 75 includes a pipe 79 about which a valve sleeve 80 turns to align ports 81 and 82 in the pipe 79 and sleeve 80 respectively to admit ink into the casing 49 when the level of the ink therein drops, the sleeve 80 being connected to the float 76 by a yoke 83.

The arrangement shown in Figure 16 provides a means whereby a supply of ink under a relatively low pressure may be maintained in the casing 25 to cause a slight flow of ink through the casing and thereby prevent settling of the solids in the ink. This arrangement includes a tank 84 containing the ink supply and from which ink is drawn through an outlet 85 preferably by a known form of gear pump 86. From the pump 86 the ink is directed under pressure through pipes 88 and 89, to ink feeding devices 87 of the herein disclosed form. The pipes 88 and 89 are connected to the inlet pipes 50 for the casings 25 of the ink feeding devices 87 whereby ink will be supplied to each device below the port plate 32.

The overflow outlet 51 for the casing 25 of these devices in this arrangement, are shown at the opposite end of the casing from that shown and previously described and are connected to the ink supply tank 84 through pipes 91 and 92. By this arrangement a slight flow of ink is caused through the casings 25 below the port plate 32 from the inlet port 50, through the bleeder port 40 to and through the overflow port 51 and back to the tank 84 through the pipes 91 and 92, whereby the solids in suspension in the ink are prevented from settling and air bubbles are carried along and do not get into the pumps and interfere with the even application and distribution of ink upon the printing form. A determined and constant pressure is maintained in the system, by the use of an adjustable bypass 93 about the pump 86 and which includes a known form of relief valve 94 adapted to be adjusted by means of a handwheel 95.

It will be noted that, by the pump structure and arrangement shown, a rotating reciprocable four cylinder pump has been provided for each duct of an ink feeding device, which by reason of the construction and arrangement of its details, will develop a substantially continuous non-pulsating flow of ink to the selected area. With such an arrangement fewer ink distributing rollers are required and a more satisfactory and particularly efficient ink distribution will be obtained. It will be further noted that each pump is individually adjustable in a range from maximum volume to an entire shut-off, by manipulation of its adjusting screw.

It will be understood that the term "duct" includes the ports 31, the passageways 33 and 28, the outlets 11 and the tubes 36 through which ink is fed to the selected area of the printing form (not shown). The pump cylinder housings 13 being provided with means whereby they are rotated and successively present the cylinders 14 to the ports in the port plate 32, they constitute in cooperation with the port plate 32, which has the intake and outlet ports 45 and 31 therein, a rotary valve device. The cylinders 14 are successively and in sequence aligned, with the intake and outlet ports 45 and 31 respectively and produce a substantially even pressure and flow of ink to the machine.

The slidable valve bar 34 interposed in the ducts between the port plate 32 and the bottom plate 29, forms a means to interrupt the con-

tinuity of the ducts through which ink is directed to a selected section of the printing form. The particular arrangement of grooves **46** and **47** in the plate **32** and in the valve bar **34** respectively, in cooperation with the grooves **48** in the bottom plate **29** forms a slidable valve device whereby, when the continuity of the ducts is interrupted (Figures 6, 13 and 14) by manipulation of these valve bars **34**, the ink will be bypassed from the outlet ports back to the inlet ports of the pumps affected and avoid any appreciable back pressure being developed.

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

What I claim is:

1. In an inking mechanism for a printing machine, an ink feeding device including a casing having a plurality of pumps therein, a plate disposed below the pumps to divide the casing into two compartments and having ports leading to the pumps to supply ink thereto, means to carry ink to the compartment below the plate, overflow means to carry surplus ink away from the casing at a level above the plate, a bleeder port through the plate, and means to maintain ink under pressure in the compartment below the plate.

2. In an inking mechanism for a printing machine, an ink feeding device including a casing having a plurality of pumps therein, a plate disposed below the pumps to divide the casing into two compartments and having ports leading to the pumps to supply ink thereto, means to direct ink to the casing compartment below the plate, overflow means to carry ink from above the plate away from the casing, an ink supply tank, a pump to draw ink from the tank and force it into the casing and to cause pressure on the ink therein below the plate, adjustable bypass means about the pump to control the ink pressure below the plate in the casing.

3. In an inking mechanism for a printing machine, an ink feeding device including a casing having a plurality of pumps therein, means to divide the casing into two compartments, ports leading from one compartment to the pumps to supply ink thereto, means to direct ink to the said one compartment, a bleeder port connecting the compartments, an ink supply tank, a pump to draw ink from the tank and force it into the said one compartment and to cause pressure on the ink therein, overflow means to carry surplus ink away from the other compartment and back to the tank, and a bypass valve about the pump adjustable to control the ink pressure in the said one compartment.

4. In an inking mechanism for a printing machine, an ink feeding device comprising a plurality of rotary cylindrical pump housings each having a plurality of cylinders and pistons carried therein, a gear on the periphery of each of the housings, each of the said gears being in mesh with a gear on an adjacent housing, and means for driving the gears and thereby rotating the housings, the said pump housings being arranged in a single plane with their axes in parallelism.

5. In an inking mechanism for a printing machine, an ink feeding device comprising a plurality of rotary cylindrical housings each having a plurality of cylinders and cooperating pistons carried therein, gear teeth on each housing, a plate in which the housings are journaled with their gear teeth in mesh to form a gear train by which the housings may be rotated in unison, means to reciprocate the pistons in sequence as the housings are rotated, and gearing to drive the gear train.

6. In an inking mechanism for a printing machine, an ink supplying device comprising a plurality of rotary cylindrical housings each having a plurality of cylinders and cooperating pistons carried therein, gear teeth on the periphery of each housing, a plate in which the housings are journaled in staggered relation with their gear teeth in mesh to form a gear train by which the housings may be rotated in unison, a pivotally supported and rotatable disc associated with each housing and arranged to reciprocate the pistons in sequence as the housing is rotated, and means to adjust the angularity of each disc to vary the stroke of the pistons.

7. In an inking mechanism for a printing machine, an ink supplying device including a plurality of pumps each having a plurality of pistons cooperating with cylinders formed in a cylindrical housing having gear teeth on the periphery thereof, upper and lower plates in which the housings are rotatably supported and between which their gear teeth intermesh, a gear driven from the printing machine and in mesh with the gear teeth of one of the housings, and an intake and an outlet port for each pump arranged to be connected in sequence with the cylinders of the pump as the housings are rotated.

8. In an inking mechanism for a printing machine, an ink supplying device comprising a plurality of pumps each having a plurality of pistons cooperating with cylinders formed in a cylindrical housing, spaced apart upper and lower plates in which the housings are journaled, a common port plate for each pump and having an intake and an outlet port, and means to rotate the housings and connect the cylinders in sequence with the intake and outlet ports and to reciprocate the pistons.

9. In an inking mechanism for a printing machine, an ink supplying device having a plurality of pumps each of which has a cylindrical housing that contains a plurality of cylinders with cooperating pistons, spaced apart upper and lower plates in which the housings are journaled, a common port plate beneath the housings and having an intake and an outlet port for each pump and grooves beside each outlet port directed along the path of the cylinders as the housings rotate, and a driving connection with the machine to rotate the housings and reciprocate the pistons.

10. In an inking mechanism for a printing machine, an ink supplying device comprising a plurality of pumps each having a plurality of pistons cooperating with cylinders formed in a cylindrical housing, spaced apart upper and lower plates in which the housings are journaled, a common port plate for each pump and having an intake and an outlet port, means to rotate the housings and connect the cylinders in sequence with the intake and outlet ports and means for reciprocating the pistons, comprising an angularly positioned member for operating each pump, the said member being pivotally secured on the upper bearing plate to reciprocate the pistons when the housings are rotated, and means axially aligned with the housings to adjust the an-

gularly positioned member and thereby vary the stroke of the piston.

11. An inking mechanism according to claim 10, in which the said port plate also has outlet passages extending axially of each said pump from its said outlet port.

12. In an inking mechanism for a printing machine, an ink supplying device comprising a plurality of pumps each having a plurality of pistons cooperating with cylinders formed in a cylindrical housing, each cylinder having a bore of greater diameter in alignment therewith and forming a shoulder at its junction with the cylinder and each piston having an enlarged end fitted to the aligned bore, a compression spring within each said aligned bore and acting between the enlarged end of the piston end therein and the shoulder to bias the piston in one direction, spaced apart upper and lower plates in which the housings are journaled, a common port plate for each pump and having an intake and an outlet port, means to rotate the housings and connect the cylinders in sequence with the intake and outlet ports, and means to press the pistons in an opposite direction to the bias of the said springs when the housing is rotated.

13. An inking mechanism according to claim 12, comprising also vents interconnecting the said

aligned bores of each housing to equalize fluid pressure therein.

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