May 15, 1923. 1,455,035

B. C. WHITE

PUMP

Original Filed July 7, 1915 5 Sheets-Sheet 1

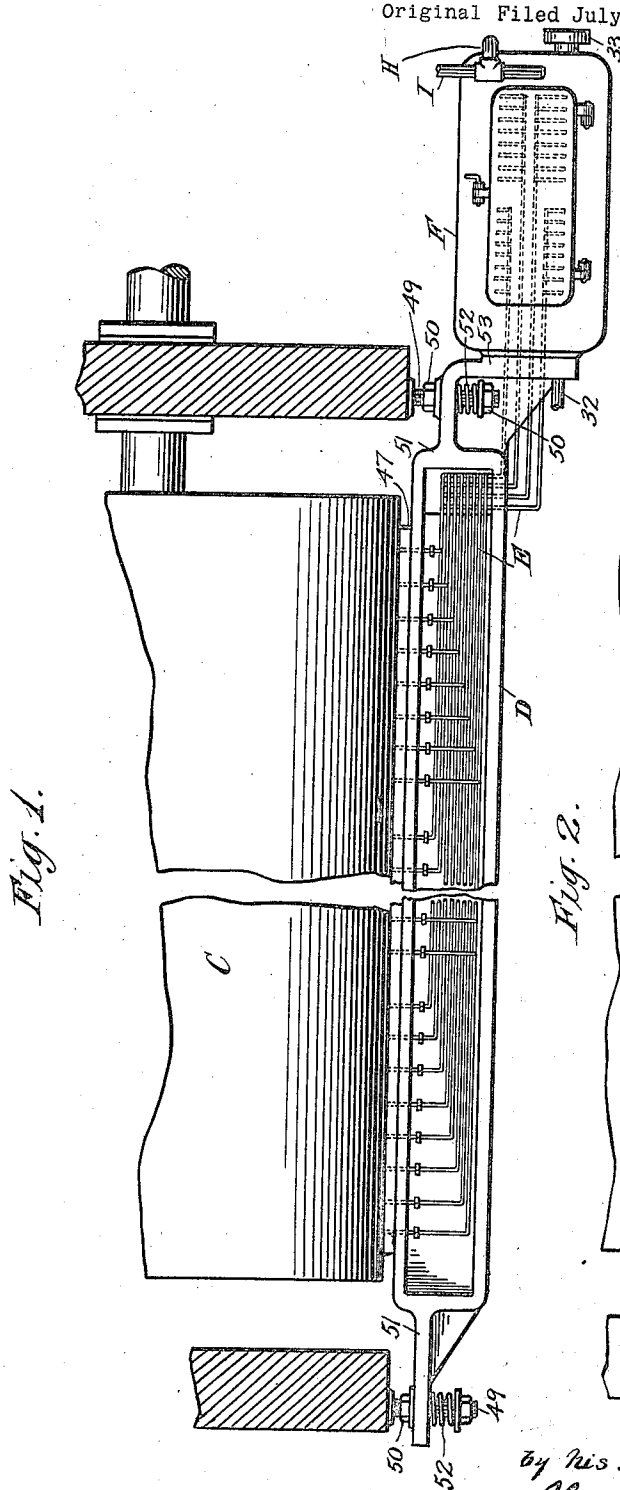

Fig. 1.

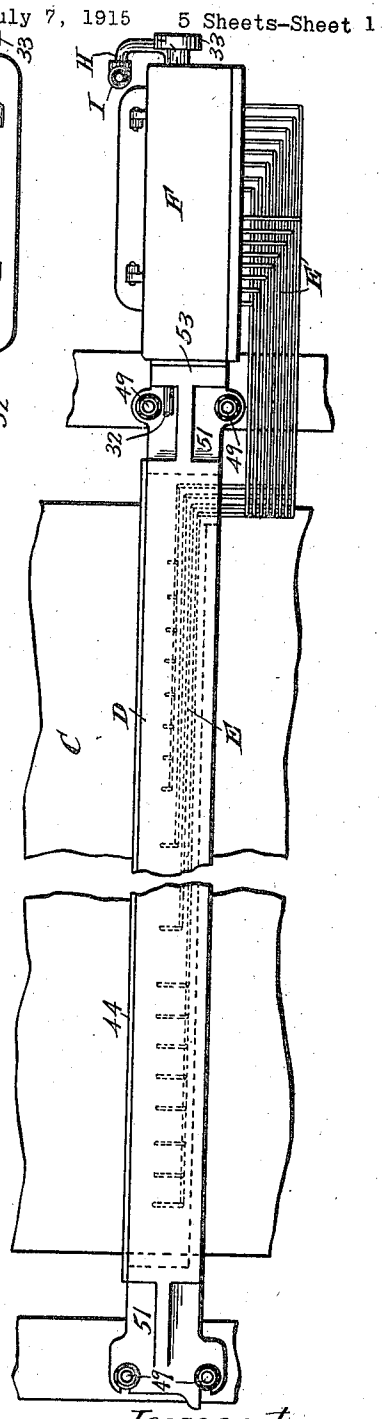

Fig. 2.

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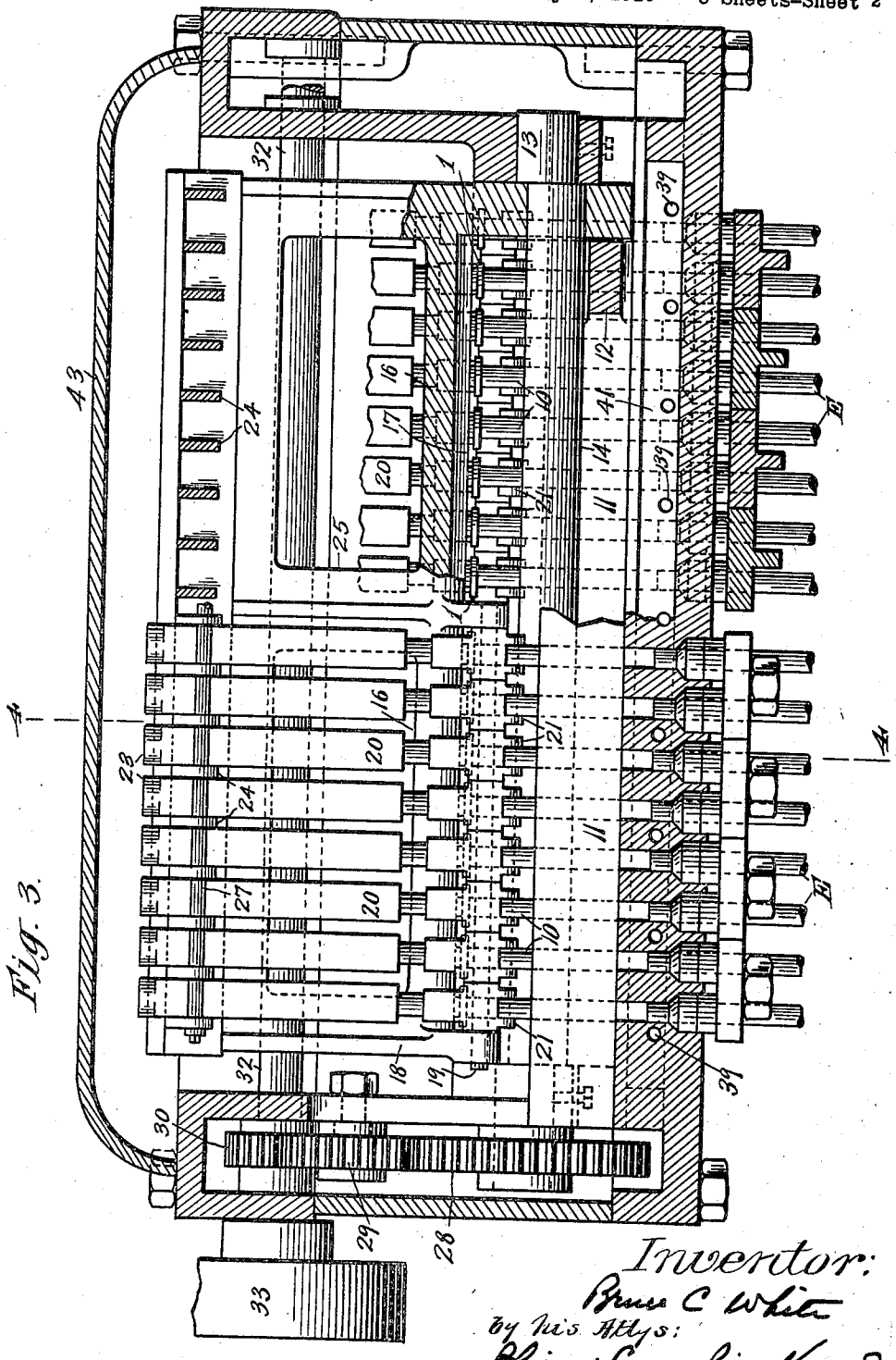

Fig. 3.

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Fig. 5.

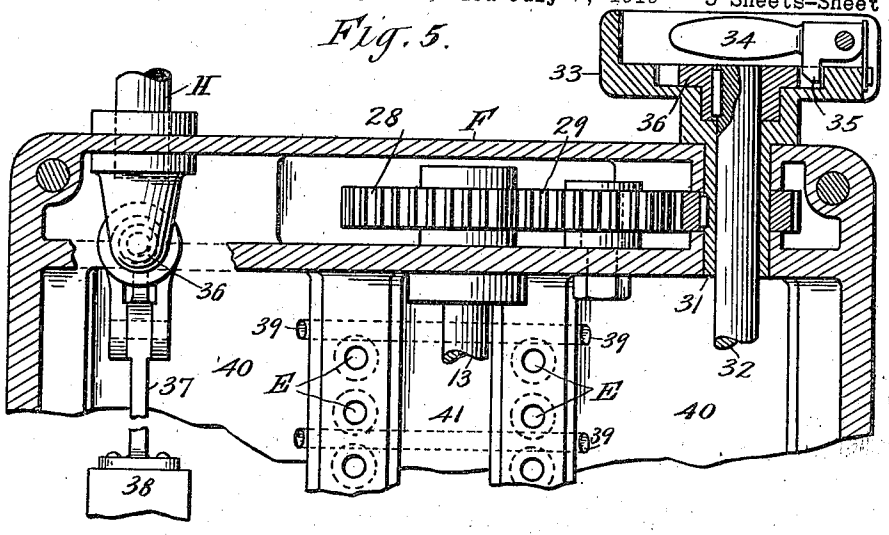
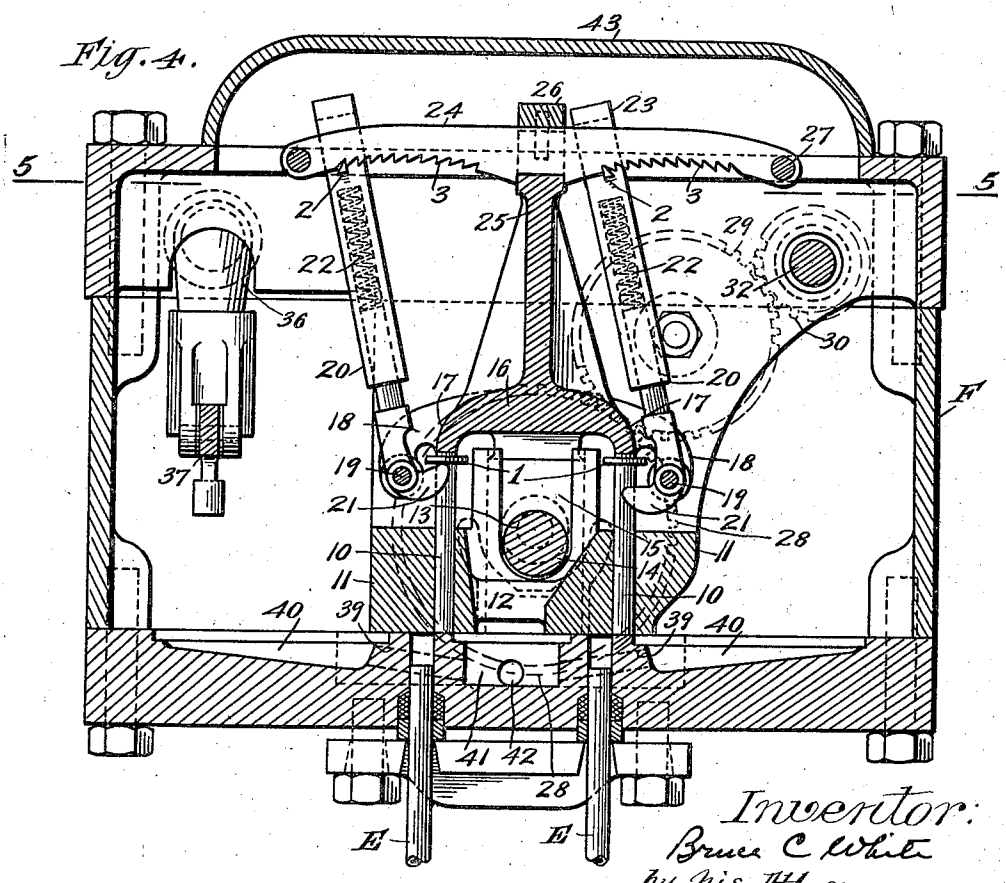


Fig. 4.



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Original Filed July 7, 1915 5 Sheets-Sheet 4

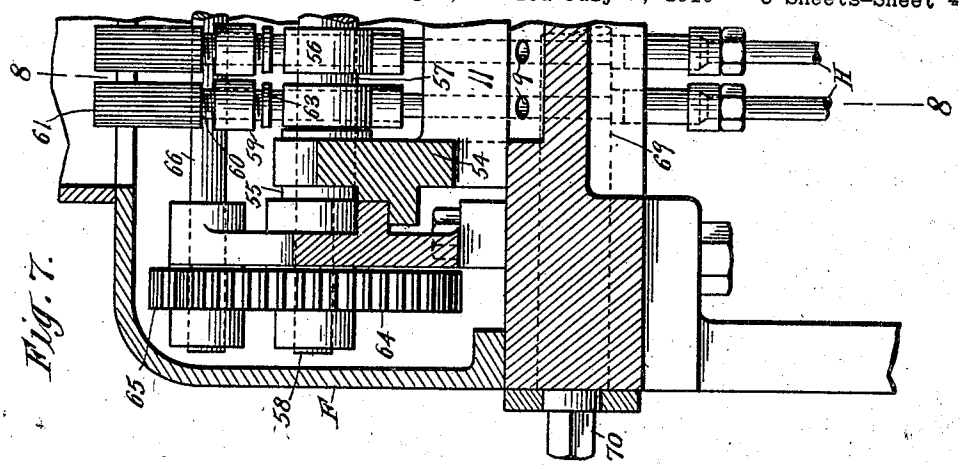

Fig. 7.

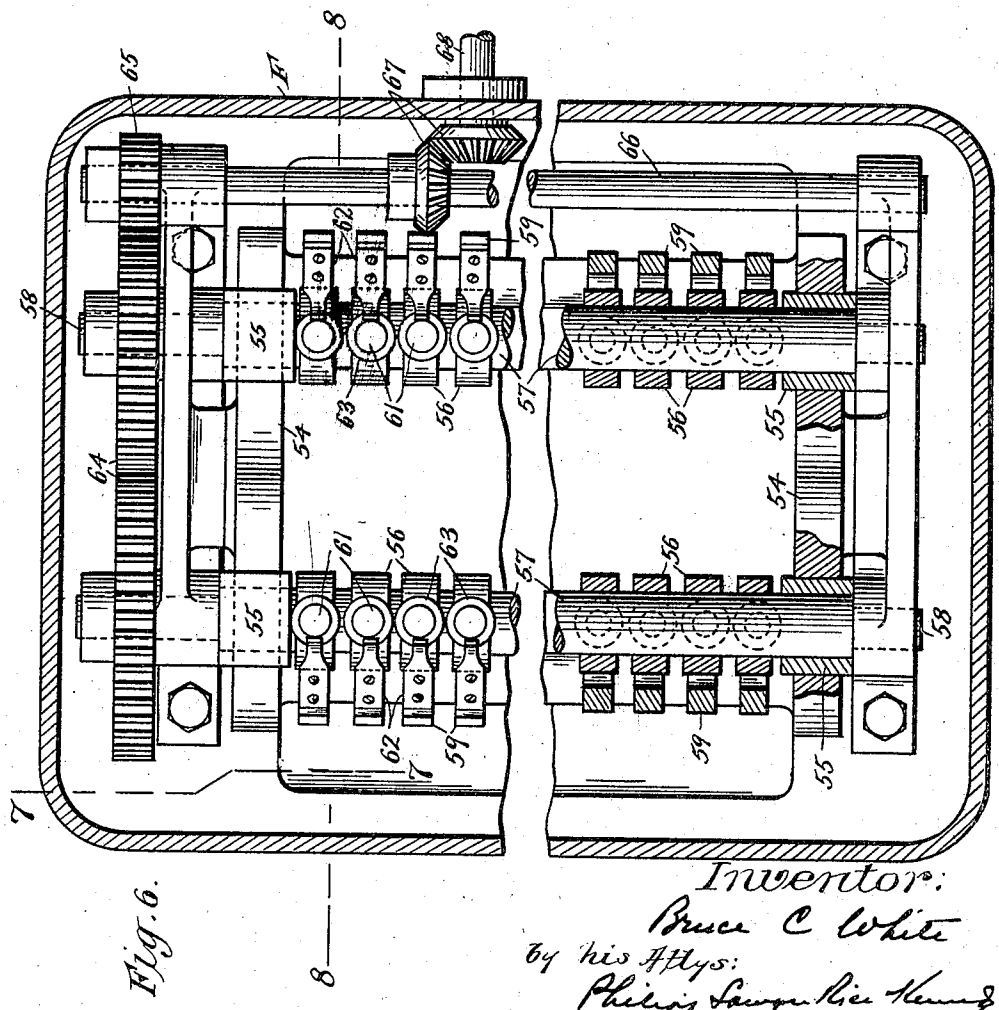

Fig. 6.

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B. C. WHITE

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Original Filed July 7, 1915 5 Sheets-Sheet 5

Fig. 10.

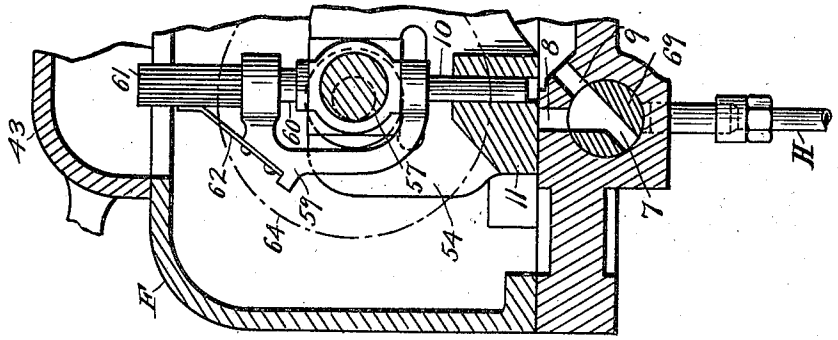


Fig. 9.

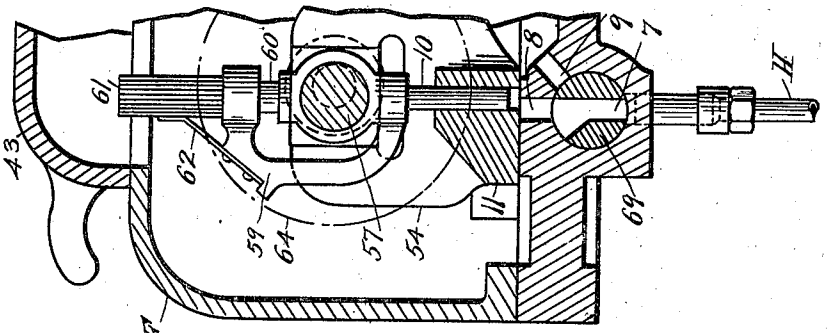
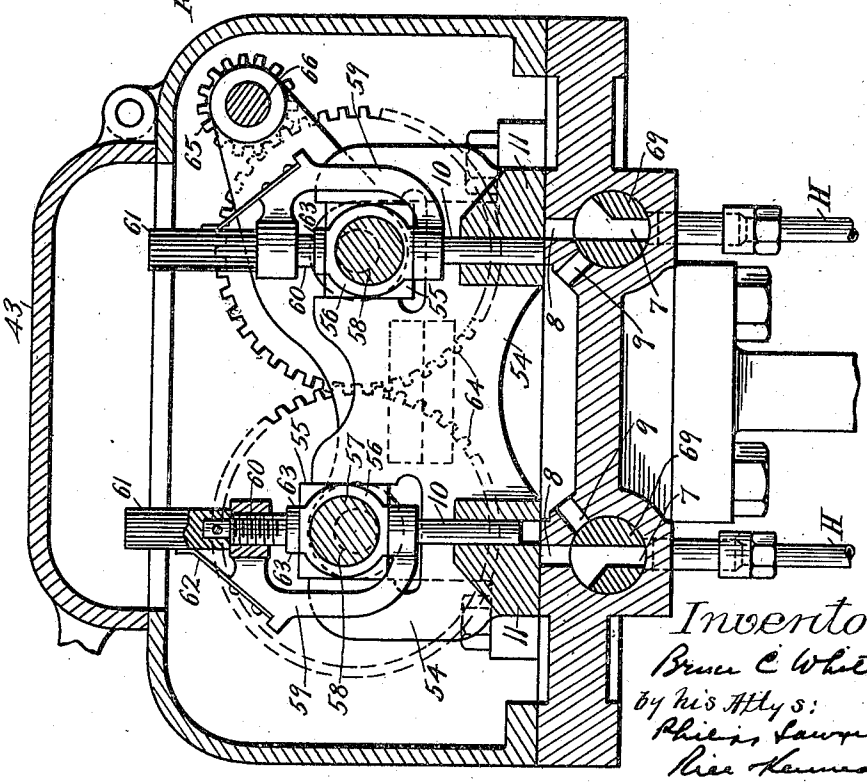


Fig. 8.



Inventor:
Bruce C. White
by his Atty's:
Philip Sawyer
Rice Kennedy

Patented May 15, 1923. 1,455,035

UNITED STATES PATENT OFFICE.

BRUCE C. WHITE, OF NEW YORK, N. Y., ASSIGNOR TO R. HOE & CO., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PUMP.

Original application filed July 7, 1915, Serial No. 38,528. Divided and this application filed June 1, 1918. Serial No. 237,702.

To all whom it may concern:

Be it known that I, BRUCE C. WHITE, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Pumps, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to an improved pump mechanism, designed for pumping and supplying fluids, and particularly for pumping and supplying ink to the distributing cylinder or other portion of the inking mechanism of a printing press, as shown for instance in my co-pending application, Serial No. 38,528, filed July 7, 1915, of which the present application is a division.

It is the special object of the invention to provide a novel and improved pump designed for pumping fluid, as ink, so as to supply the fluid under pressure and in regulated quantities. A further object of the invention is to provide a pumping mechanism including a plurality of valveless plunger pumps which can be independently adjusted so that the fluid may be supplied in varying quantities by each of the pumps.

With these and other objects not specifically referred to in view, the invention has been illustrated in the accompanying drawings as employed with the distributing apparatus of a printing machine, though it will be understood that it may be used in other relations and for pumping fluid other than ink.

For a full understanding of the invention a description of the same will be given in connection with these drawings, in which

Figure 1 is a diagrammatic plan view partly broken away and partly in section of a distributing cylinder of a printing machine and the ink supply mechanism.

Figure 2 is a side elevation of Figure 1.

Figure 3 is a vertical section partly broken away of the ink supply reservoir, showing the supply mechanism.

Figure 4 is a cross section on the line 4—4 of Figure 3 showing the pump and the operating mechanism therefor.

Figure 5 is a horizontal section, certain parts being broken away, and certain parts being omitted on the line 5—5 of Figure 4.

Figure 6 is a horizontal broken section through the ink supply reservoir showing a modification of the supplying means.

Figure 7 is a vertical section on line 7—7, of Figure 6.

Figure 8 is a vertical cross section on the line 8—8 of Figures 6 and 7; and

Figures 9 and 10 are partial views similar to Figure 8, but showing the operative parts in different positions.

In the drawings the invention is illustrated as used for pumping ink, and is shown, furthermore, embodying a plurality of pumps for independently supplying ink to different sections or parts of the form. It will be understood, however, that this showing is only for the purpose of illustration and that the improved pump mechanism may be used either singly or in multiple, depending on the purpose for which it is required, and may be used with devices or machines other than printing machines, and with fluids other than ink.

In the present application of the invention, ink is supplied to a distributor C from groups of ink delivery nozzles arranged in casings D and supplied with ink through conduits or supply pipes E from supply reservoirs F containing the pumps to which ink is supplied from any suitable source (not shown).

The pump or pumps are located in the reservoirs F, which are kept partially filled with ink or other fluid. Where, as in the present instance, ink is to be supplied to a printing machine, a plurality of the pumps will be employed. The pumps will, however, be similar in construction and operated in a similar manner, no matter what number are employed, and the construction and operation of a plurality of these pumps will be described.

These pumps as shown, force the ink through the conduits or supply pipes E, which are packed in openings formed in the bottom of the reservoir. A single acting pump, having vertically acting plunger 10, is provided for each desired section of the form, usually a column, two parallel rows of these pumps being shown, the pump chambers for these pumps being formed in bars 11 extending lengthwise of the reservoir F and united by cross bars 12 to form a frame open between the bars 11 to receive shaft 13 carrying eccentric 14, by

which the frame, with its pump cylinders and plungers, is moved sidewise and the plungers 10 reciprocated, the eccentric 14 securing this sidewise movement of the frame through action on yokes on cross bars 12 of the moving frame, and the vertical movement through action on vertical bars 15 mounted to slide vertically in these yokes, while held from sidewise movement therein. These bars 15 form downward extensions of a bar 16 extending longitudinally of the reservoir above the pumps and which has arms 17 extending over the pump plungers 10 so as to engage and operate the latter on the downward movement of the plate bar 16. This bar 16 also carries arms 18 extending on opposite sides of the bar, which arms carry pivot shaft 19 on which are loosely mounted rock arms 20, one for each plunger, having toes 21 extending inwardly under flanged heads 1 of plungers 10, and these arms 20 are formed of a sleeve and enclosed sliding stem, so as to be extensible and spring-pressed apart by spring 22, the sleeve having a head 23 numbered to correspond with the column or section of the form supplied by its pump, and the sleeve being provided with a catch 2 adapted to engage teeth 3 for holding the rock arm in adjusted position, these teeth 3 being formed in the underside of arms 24 projecting in opposite directions from central web 25 extending upward from bar 16, the arms 24 preferably being made separately and secured in slots in the web 25 by a cover bar 26, as shown. The ends of the arms 24 are tied together by rods 27 with spacing sleeves between the arms so as to form the parts carried by bar 16 into a frame that reciprocates vertically in the frame formed by bars 11 and cross bars 12 and moves sidewise with the latter frame.

The shaft 13 may be driven by and suitable means, but as shown is driven by gear 28 and intermediate 29 from gear 30 on sleeve 31 loose on driving shaft 32 and carrying disk 33 having handle 34 mounted therein, this handle 34 having a point 35 entering a recess in disk 36 keyed to shaft 32, so as to clutch disk 33 and sleeve 31 to the shaft for driving the pumps when the handle 34 is thrown into the position shown in Fig. 5, while by rocking handle 34 outward against its holding spring, sleeve 31 is released from shaft 32, and the pumps can then be run by hand at the speed desired for testing, cleaning or repair, or cleaning fluid may be run through the pumps and pipes, if desired. The driving shaft 32 may be driven from the distributing cylinder or other part of the press by any suitable gearing so as to secure the proper speed, or may be dirven by separate motor, if preferred.

The ink is preferably maintained at the desired level in the reservoir F by float control, the inlet pipe H being controlled by valve 36 under the control of float lever 37 and float 38, which parts may be of any suitable construction. Circulation of ink from the side of the pump frame at which supply pipe H enters is provided for by passages 39 connecting side troughs 40 with a central trough 41, with which connects a drainpipe 42, provision thus being made for draining the reservoir from troughs 40, 41, in which any sediment or thickened ink will collect and for washing the reservoir by running water or cleaning fluid therethrough. The reservoir is preferably provided with a hinged cover 43, as shown, by raising which access is had to all the heads 23 of the adjusting arms 20 for varying the supply of ink to any column or columns of the form.

The supply reservoir F is kept full to the required level by the float control of branch pipes H, so that a constant suction supply to the pumps is thus maintained. The pump chambers formed in blocks 11 and in which the pump plungers 10 move, are brought by eccentric 14 alternately into connection with the reservoir on the upward or suction stroke of the plungers 10 and into line with the ports in the reservoir bottom connecting with pipes E for the downward or delivery stroke of the plungers, and the vertical movement of the bar 16 and plunger operating parts carried thereby is secured in proper time by the eccentric 14. A measured quantity of ink is thus delivered by each pump under fixed pressure at each stroke of the plungers 10. These valveless pumps aid materially in assuring the proper action of the pumps and their delivery of a fixed quantity of ink, and avoid the difficulties incident to handling ink with valved pumps.

As described above, the lift of each plunger 10 on the suction stroke is determined by the position of its rocking arm 20 which determines the time of engagement of toe 21 with plunger head 1, and the position of the arms 20 is readily adjusted by moving the numbered heads or finger pieces 23 sidewise.

In Figures 6 to 10 there is shown a slightly modified construction of pumps and regulating means, the other parts of the apparatus being the same as above described. In this case the plungers 10 and the blocks 11 containing the pump chambers of the two sets are actuated by separate eccentrics, the two blocks 11 being connected by cross plates 54 at opposite ends, which are vertically slotted to receive sliding blocks 55 carrying eccentric sleeves 56 in which run eccentrics 57 on shafts 58, so that the rotation of the eccentrics moves the blocks 55, with the frame formed by plates 54 and bars 11,

sidewise, and moves the blocks 55, with their eccentric sleeves 56, vertically. The pump plungers 10 carry yokes 59, the upper ends of which are threaded on adjusting screws 60 having finger pieces 61 extending upward into convenient position for access when the cover is lifted and preferably held in any adjusted position by springs 62 engaging the knurled side of the finger pieces. The adjusting screws 60 carry heads 63 engaging the eccentric rings 56 to raise the plungers 10 the length of the suction stroke or lift of the plunger, the amount of ink delivered thus being regulated by the position of the screws 60, which determines the lift of the yokes 59 and plungers 10 by the eccentrics. The eccentric shafts 58 may be rotated by any suitable means, but are shown as geared together by gears 64 operated by gear 65 on shaft 66, which in turn, is driven through bevel gears 67 from driving shaft 68 outside the reservoir F, and actuated from the press or otherwise in any suitable manner.

In this construction there is shown, also a convenient means for cutting out a whole page of the inking, or such part thereof as the construction may be designed for, by a single valve, which arrangement also is readily applicable to the construction shown in Figures 1 to 5, and above described. For this purpose each row of the conduits or supply pipes H connects with a circular valve chamber in which is mounted a rotating valve 69 extending over the whole row of conduits H, or such part thereof as desired, and accessible from outside the reservoir for rotation, as by the squared head 70, shown in Figure 7. These valves 69 have transverse ports 7, and the bottom plate of the reservoir F is provided with two passages 8, 9, one connected with the pump chamber and the other with the reservoir, so that by turning a valve 69 into the position shown in Figures 8 and 9, the pumps in the row corresponding to the valve will deliver ink from the chamber through ports 8, 7, into the conduits or supply pipes H, and by turning the valve into the position shown in Figure 10, the pumps of its row will be closed to pipes H, and the ink be circulated through ports 8, 7, 9, from the pump to the reservoir on the discharge stroke. The simple rotation of a valve 69, therefore, will cut out a page, or such portion of the inking as the apparatus may be designed for, without interfering with the adjustment of the separate pumps.

The operation of the construction shown in Figures 6 to 10 will be substantially the same as that described in connection with Figures 1 to 5, except as will be understood from the drawings, so that no further description of operation is required.

While the construction illustrated and described is one which is effective for carrying out the invention, and is preferably used with printing presses, it will be understood that changes may be made in the construction and arrangement of the device as shown in accordance with the character of machine with which the pumping mechanism is used and the character of fluid to be supplied by the pump.

What is claimed is:

1. A multiple pump consisting of a frame carrying a series of pump chambers and plungers, said pump chambers opening for suction and discharge in the line of movement of the plungers, suction and discharge chambers, a second frame movable transversely to the line of movement of the pump chambers, carried by the first mentioned frame and movable therein parallel with the line of movement of the plungers, means mounted in said second frame for operating the plungers, and a shaft extending through the frames and carrying eccentric mechanism for moving said frames to shift the pump chambers for suction and discharge and operate the pump plungers.

2. A multiple pump consisting of a frame carrying a series of pump chambers and plungers, said pump chambers opening for suction and discharge in the line of movement of the plungers, suction and discharge chambers, a second frame movable transversely to the line of movement of the pump chambers, carried by the first mentioned frame and movable therein parallel with the line of movement of the plungers, means mounted in said second frame for operating the plungers, and a shaft extending through the frames and carrying a single eccentric actuating both of said frames to shift the pump chambers for suction and discharge and operate the pump plungers.

3. A multiple pump consisting of a frame carrying a series of pump chambers and plungers, said pump chambers opening for suction and discharge in the line of movement of the plungers, suction and discharge chambers, a second frame movable transversely to the line of movement of the pump chambers, carried by the first mentioned frame and movable therein parallel with the line of movement of the plungers, means mounted in said second frame for operating the plungers, a shaft extending through the frames and carrying eccentric mechanism for moving said frames to shift the pump chambers for suction and discharge and operate the pump plungers, and means carried by said frames for adjusting the stroke of the plungers to vary the amount of fluid delivered.

In testimony whereof, I have hereunto set my hand.

BRUCE C. WHITE.