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2,230,503

VIBRATION MOTION FOR INKING SYSTEMS

Filed Jan. 27, 1939

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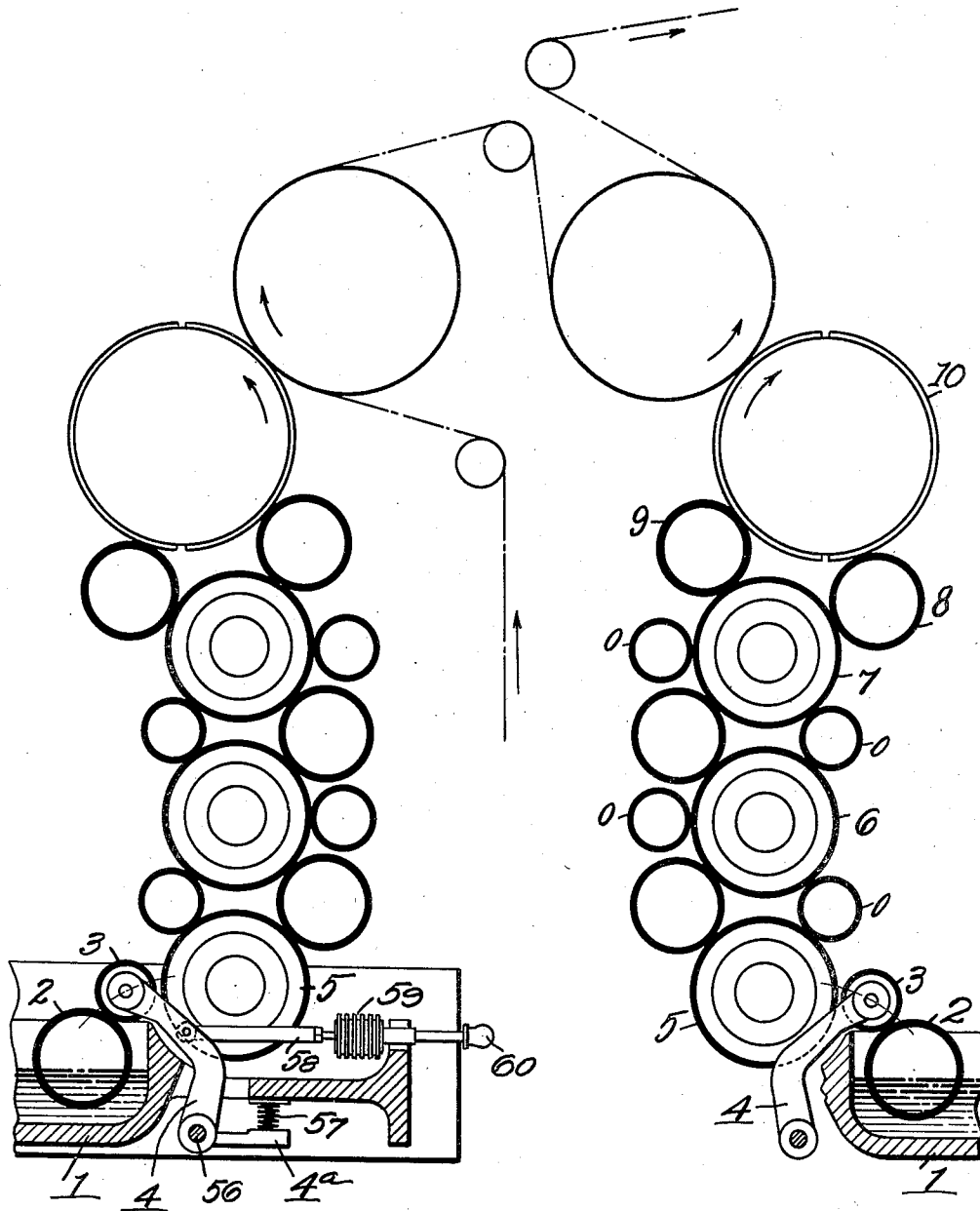


Fig. 1

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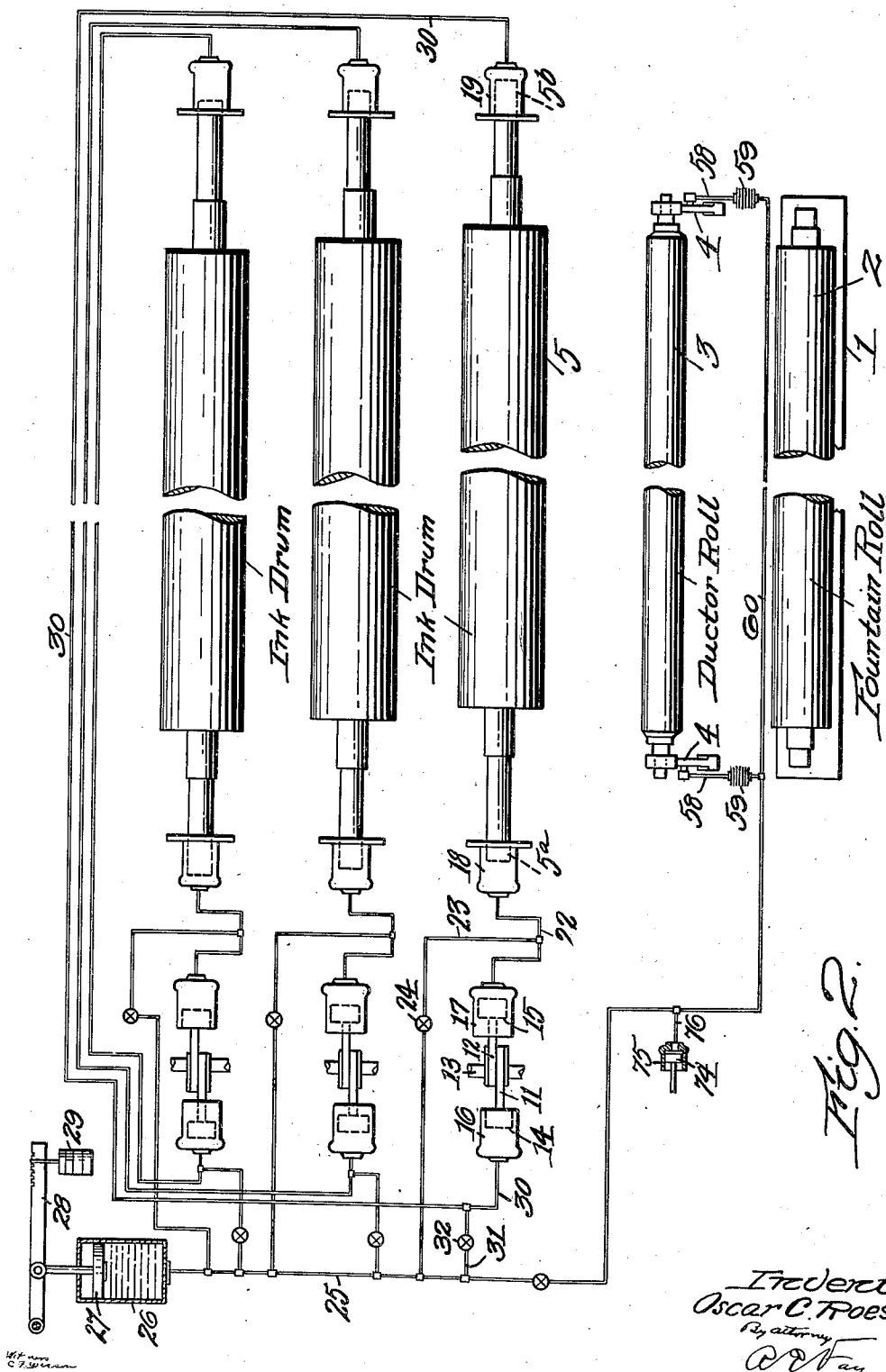
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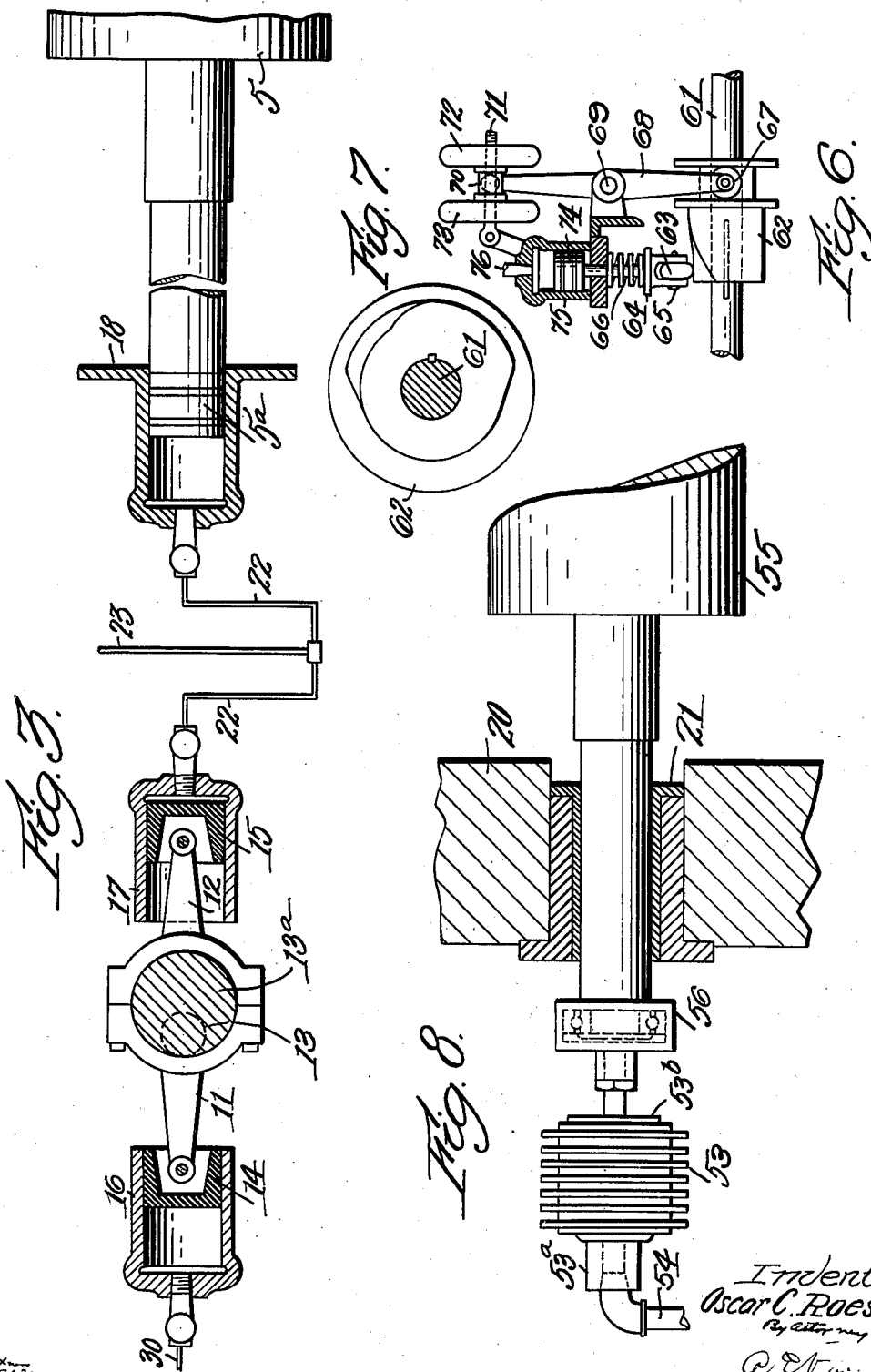
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VIBRATION MOTION FOR INKING SYSTEMS

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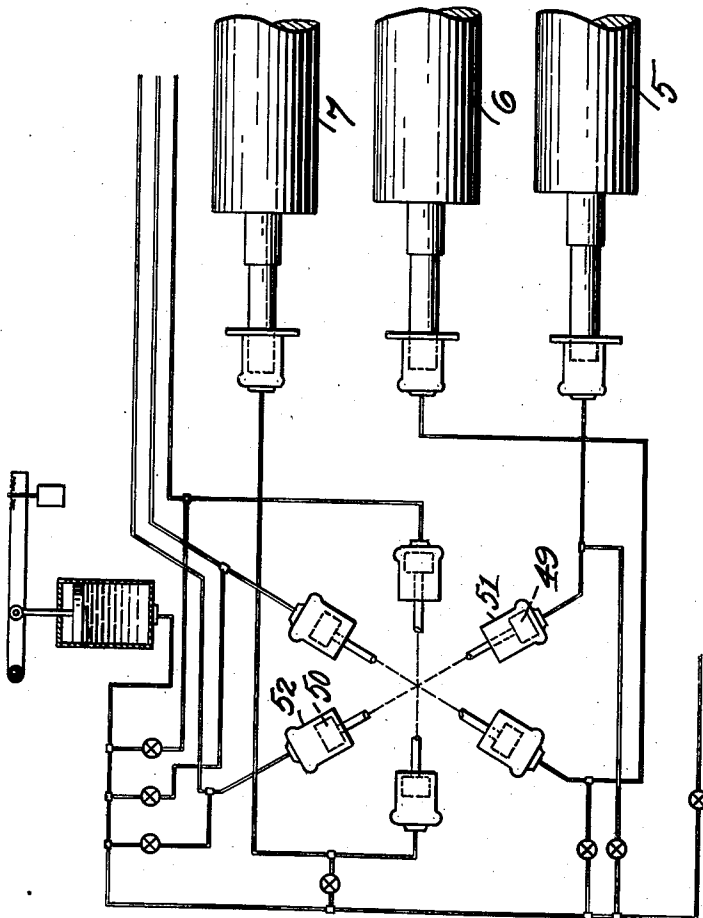
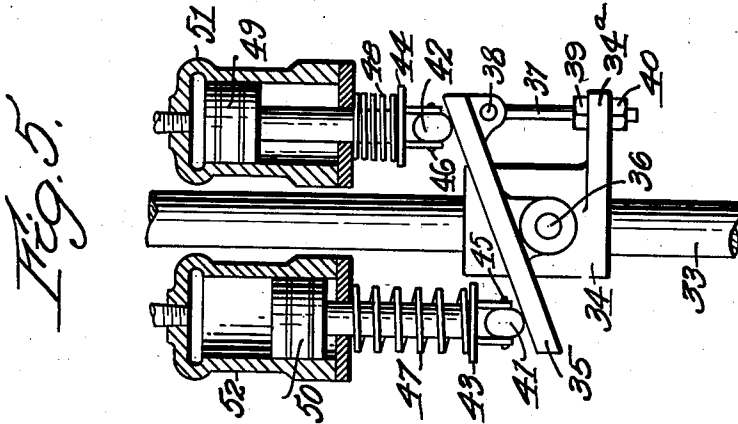


Fig. 4.

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UNITED STATES PATENT OFFICE

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VIBRATION MOTION FOR INKING SYSTEMS

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Application January 27, 1939, Serial No. 253,057

2 Claims. (Cl. 101—349)

The principal objects of this invention are to eliminate the shock and jar to moving parts usually present in reversing the end motion of the ink cylinders; to employ hydraulic means therefor, and to provide means for varying the length of the dwell of the ductor roller. It is contemplated using hydraulic means for oscillating the ductor roller and particularly of the kind which employs a Sylphon type of mechanism.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a diagrammatic view of a printing press showing particularly on the right hand side a system of rollers employed to transfer and distribute ink from a suitable fountain to the plate cylinder and on the left hand side an extension thereof in cross section;

Fig. 2 is a diagrammatic view of the roller vibration arrangement applied to three ink drums;

Fig. 3 is a cross section of a pump arrangement for the system shown in Fig. 2;

Fig. 4 is a roller vibration arrangement of modified form;

Fig. 5 illustrates in elevation a pump arrangement used to vary the piston stroke and the travel of the ink cylinder;

Fig. 6 is an elevation in partial cross section of a pump used to operate the ductor roller;

Fig. 7 is a detail view of a cam used in the pump of Fig. 6, and

Fig. 8 is an elevation of a roller employing a Sylphon bellows to control the end motion according to this invention.

A fountain bowl 1, shown in Fig. 1, carries a supply of ink at such level that a fountain roller 2 is partially immersed therein. Rotation of said roller will cause ink adhering thereto to be brought up to a ductor roll 3, rotatably mounted in an arm 4 which, by oscillation, carries the ductor roll 3 from contact with the fountain roller 2 into contact with an ink drum 5. The ductor roll 3, while in contact with the fountain roll 2, accumulates a supply of ink which is then transferred to the ink drum 5.

A plurality of ink drums 5, 6 and 7, with suitable transfer and distributing rollers 8, carry the ink film to form rollers 8 and 9 that are in contact with the type cylinder 10. Longitudinal motion of drums 5, 6 and 7 will cause the film of ink to be spread evenly over the surface of the rollers and transmit this even layer of ink to the

plate cylinder to produce a uniformly printed surface.

So far this is well known.

This invention provides for means to move or vibrate the drums 5, 6 and 7 longitudinally by hydraulic pressure and thus provide a cushioned action. Fig. 3 shows a pump designed for a fixed motion. Piston rods 11 and 12 are mounted on an eccentric cam shaft 13 and carry at their outer ends pistons 14 and 15 slidably mounted in cylinders 16 and 17 respectively.

The ink drums 5, 6 and 7 are similar in details and are mounted in a side frame 20 by sleeve type bearings 21, as shown in Fig. 8. This type bearing secures the ink drum radially but allows a longitudinal motion.

Referring particularly to the ink drum 5 in Fig. 2, it will be noted that the shaft ends are made in the form of and become pistons. Piston ends 5^a and 5^b are accommodated by single acting cylinders 18 and 19 respectively.

Piping 22 connects the cylinder 18 to a cylinder 17 of the pump arrangement, and by means of piping 23 with a check valve 24 mounted therein, is connected to a supply line 25. Said supply line is connected to a pressure maintenance supply 26 of pressure fluid, as oil, which is kept under constant pressure by a piston 27. This piston is operated by a lever arm 28 and weight 29. The opening of the check valve 24 will allow oil supply to fill piping 22 and cylinders 17 and 18. The closing of check valve 24 will trap oil in the pipe 22 and cylinders 17 and 18. The compression of oil in the cylinder 17 by piston 15 will force oil into the cylinder 18 and move the ink drum 5 to the right.

The cylinder 19 is connected to the cylinder 16 by a pipe line 30. Piping 31 with a check valve 32 mounted therein connects the piping 30 to the oil supply line 25.

The action of the piston 14 in the cylinder 16 is similar to that of the piston 15 in the cylinder 17. As demonstrated in Figs. 2 and 3, the pistons 14 and 15 are operated by the same cam 13^a on the shaft 13 and cooperate with each other for the effective movement of the ink drum 5. Rotation of the shaft 13, which is operated from the main press drive through mechanism, not shown, moves the piston 15 into the cylinder 17. This forces oil out through the line 22 into the cylinder 18 and, as stated before, moves the ink drum 5 to the right. Said movement of the ink drum causes the piston end 5^b to move into the cylinder 19 and forces oil out through the

pipe line 30 into the cylinder 16 from which the piston 14 is partially withdrawn. Further rotation of the shaft 13 will reverse the positions of the pistons 14 and 15 in their respective cylinders and thereby move the ink drum 5 to the left. Continued rotation of the shaft 13 will cause the ink drum 5 to move back and forth longitudinally, with its motion dependent on the length of stroke and oil pump displacement.

It is sometimes desirable to alter the length of the ink drum's travel. This is accomplished by using the pump arrangement shown in Figs. 4 and 5. The pumps are arranged in a radial manner about a drive shaft 33 and are placed parallel to it. The pumps are arranged in pairs 180° apart and are connected to the several ink drums in the same manner previously described. This set-up is for the three ink drums 5, 6 and 7, of course.

As shown in Fig. 5, a shaft 33 has mounted thereon a cam support 34 to which a cam plate 35 is pivotally secured by a hinge pin 36 and held in adjustment by a stud 37 secured to the plate 35 by a hinge pin 38. The stud 37 passes through a cam support extension 34^a and is locked thereto by clamp nuts 39 and 40.

The plate cam 35 accommodates rollers 41 and 42 secured to the ends of piston rods 43 and 44 respectively by pins 45 and 46. Springs 47 and 48 force said rollers against the cam 35. The piston rods are attached to pistons 49 and 50 in cylinders 51 and 52, and their action is the same as that obtained previously by pistons 14 and 15, rotation of the cam 35 moving the pistons in and the pressure of the springs moving the pistons out.

Fig. 8 illustrates the application of a Sylphon bellows to vibrate an ink drum. A bellows 53 is connected to the oil pumps by piping 54. Said bellows has one end 53^a secured, and the application of pressure will cause expansion and consequent outward movement of the opposite end 53^b. This latter end 53^b is attached by a suitable ball bearing housing 56 to an ink drum 55. Said connection allows end thrust placed upon the ink drum without rotation of the bellows. It will be understood that this type bellows may be placed at either or both ends of the drum. A variation in length of vibration stroke can be obtained as just previously described. From this description it is evident that with the machine in operation the hydraulic pumps will vibrate the ink drums back and forth, to effectively distribute the ink.

It is contemplated also to control the ductor roll 3 by hydraulic pressure. With particular reference to the left side of Fig. 1, the fountain bowl 1 with fountain roll 2 partially submerged therein supplies ink to the ductor roll 3 through intermittent contact with the roller 2. The ductor roll 3, rotatably mounted at one end of the arm 4, is oscillated back and forth from the fountain roll 2 to the ink drum 5.

The arm 4 is pivoted at 56 and an extension 65 of the arm 4^a cooperates with the fountain bowl 1 to hold a spring 57 in position, Fig. 1. Said spring tends to rotate the arm 4 on its axis and consequently move the roller 3 towards the ink drum 5. A link 58 has one end hinged to the arm 4 and its opposite end is secured to the expanding end of a Sylphon bellows 59. The opposite end of said bellows is secured against mo-

tion and is connected by piping 60 to a pump to be described. The application of pressure to the bellows 59 expands it and rotates the arm 4 about its pivot 56 in a counterclockwise manner towards the fountain roll 2. The release of pressure in the bellows allows the spring 57 and the springiness of the bellows 59 to return the ductor roll against the ink drum.

The pump operating the ductor roll is diagrammed in Fig. 6 and is connected and operated from the press drive through a shaft 61 which has keyed thereto a cam 62 which is slidably adjustable along the shaft. Fig. 7 gives a more detailed view of the type of cam employed. The cam 62 is made in such fashion that changing the longitudinal position of the cam will vary the amount of dwell on the high or low points of the cam which comes in contact with a roller 63. Said roller is carried at one end of a piston rod 64 by a pin 65. A spring 66 forces the roller against the cam 62.

Shoulders on the cam 62 accommodate a trunnion 67 of a cam shifter yoke 68 that is pivotally secured to the framing at 69. A poppet 70 mounted at the upper end of said yoke accommodates a threaded stud 71 that is attached to the framing. Hand wheels 72 and 73 are used to move the yoke 68 and consequently the cam 62. A piston 74 secured to the piston rod 64 is slidably contained in a cylinder 75. The compression of oil therein will eject oil out through a connection at 76 through piping 60 to the bellows 59. (Fig. 2.)

It is evident from this description that hydraulic pressure can be utilized to produce an effective and efficient means of operating ink drum vibrating parts in a printing press, eliminating shock and jar. Means are also provided for varying the stroke of vibration, insofar as the ink cylinders are concerned, and the length of dwell of the ductor roller.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. The combination with a vibrating ink drum and its shaft, of a cylinder at each end of the shaft, the ends of the shaft constituting opposite single acting pistons in said cylinders, a pipe line for connecting said cylinders with a source of fluid for operating said pistons, means for maintaining the fluid under constant pressure, a pair of single acting cylinders and pistons, means for connecting the last named cylinders with said source and disconnecting them therefrom, eccentric means for operating the last named pistons alternately, and means for connecting each of the last named cylinders to the first named cylinders respectively and alternately.

2. In an ink supplying device, the combination with ink drums and ink drum shafts therefor, of a cylinder at each end of each shaft, the ends of the shafts each constituting a single acting piston in one of said cylinders, and means for conducting a fluid under pressure to said cylinders to vibrate the ink drum, said several means each constituting a pair of cylinders and pistons arranged around a circle with each pair for controlling opposite ends of one shaft located 180° apart and means for maintaining the fluid under constant pressure.

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