Jan. 17, 1956 W. F. DAVIS 2,730,947

INKING MECHANISM FOR PRINTING MACHINES

Filed May 31, 1952 2 Sheets-Sheet 1

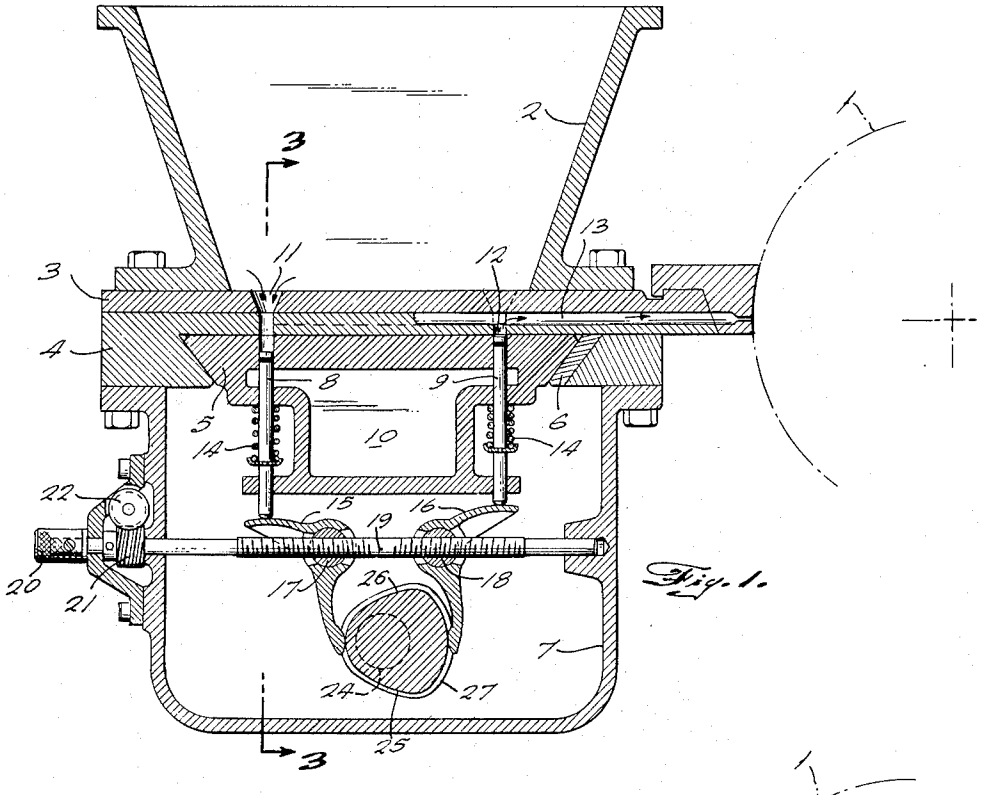


Fig. 1.

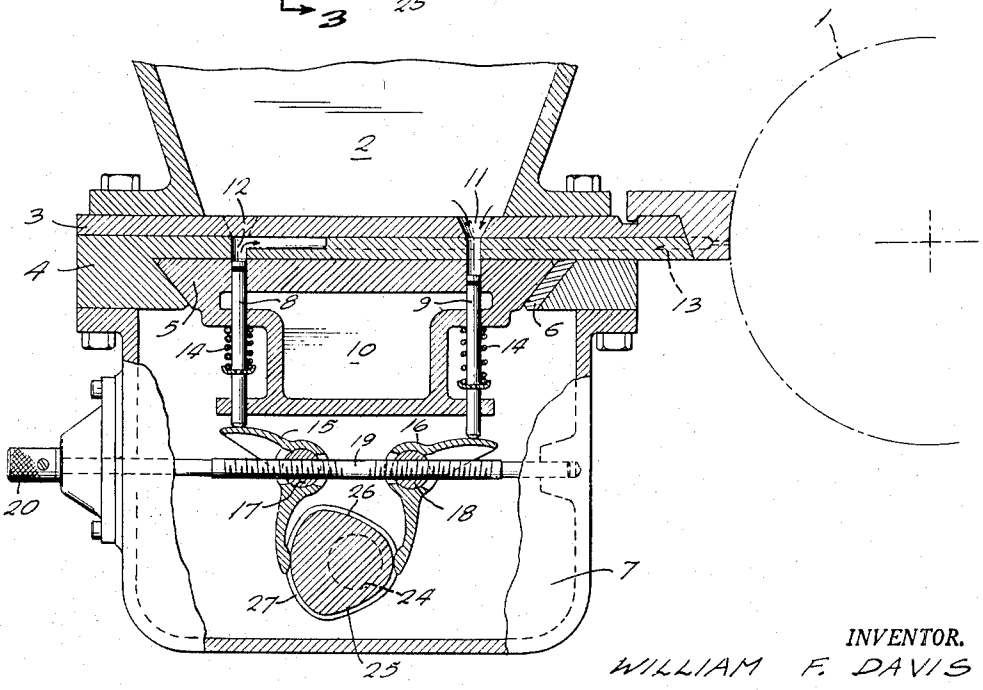


Fig. 2.

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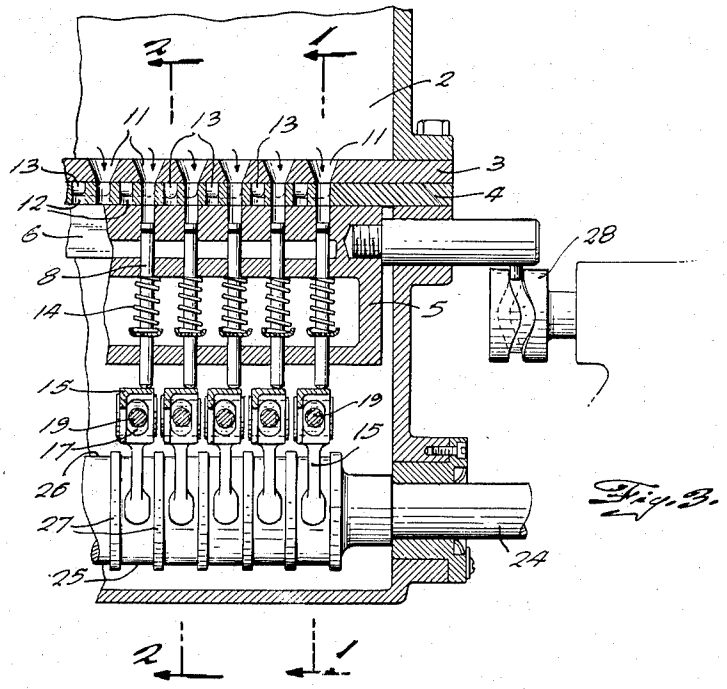


Fig. 3.

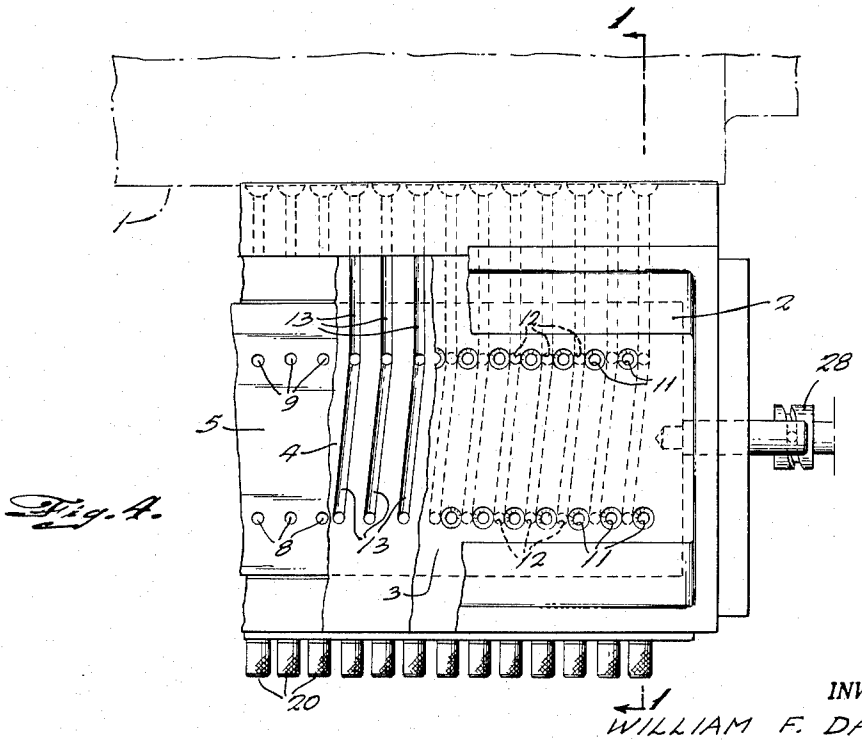


Fig. 4.

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INKING MECHANISM FOR PRINTING MACHINES

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8 Claims. (Cl. 101—366)

This invention relates to improvements in inking mechanisms for printing machines.

More particularly, the invention is concerned with inking mechanisms of the type in which ink is supplied to the ink drum of an ink motion through an ink rail fed through a number of conduits by a number of small pumps.

It is an object of the invention to improve the pumping cycle in an inking mechanism of the character indicated, so as to permit a more efficient handling of the ink.

Another object of the invention is to provide an inking mechanism of the type indicated providing improved ink supply at partial as well as full rates of ink supply.

A still further object of the invention is to provide improved lubrication for the ink pumps of a pumping mechanism while preventing harmful intermingling of ink and lubricant.

A mechanism embodying the invention in a preferred form will now be described with reference to the accompanying drawing, and the features forming the invention will then be pointed out in the appended claims.

In the drawing:

Figure 1 is a section on the line 1—1 of Figures 3 and 4, of an inking mechanism of preferred form;

Figure 2 is a similar section on the line 2—2 of Figure 3;

Figure 3 is a section on line 3—3 of Figure 1; and

Figure 4 is a plan view, with parts progressively broken away to show the structure of the various parts.

A drum 1, to which the ink is supplied, is indicated in phantom outline in Figures 1, 2 and 4. It will be understood that ink is conveyed from the drum 1 by any suitable train of transfer and distributor rolls to a printing cylinder (not shown) in the usual way. The mechanism for inking the drum 1, includes an ink trough 2, an upper port plate 3 forming the floor of the trough 2, and a lower port and conduit plate 4 formed with dovetail guides for a reciprocating cylinder block 5. Proper sliding clearance for the block 5 may be obtained and restored after wear of the parts by a filler piece 6. The pumping mechanism is enclosed in an oil housing 7, and comprises a set of front pistons 9 and rear pistons 8 reciprocably carried in cylinder bores formed in the block 5. A chamber 10 within the body of the block 5 receives any leakage ink which may come out of the cylinder bores past the pistons 8 and 9, thus preventing its falling into the lubricant housing 7 and contaminating the oil therein.

Plates 3 and 4 are formed with a number of suction or intake ports 11 and discharge ports 12, the latter communicating through conduits 13 with the orifice or slot through which ink is supplied to the ink drum 1. The intake ports 11 and discharge ports 12 for the front pistons 9 are alternated along the length of the mechanism, in the direction of reciprocation of the cylinder block 5, as shown in Figure 4, and the intake and discharge ports for the rear pistons 8 are similarly alternated but are staggered with relation to the ports for the front pistons 9. The conduits 13 are twisted as necessary (Figure 4) so as to communicate with the discharge ports for pistons of both the front and rear sets.

Conveniently, although not necessarily, the front and rear pistons are arranged in pairs to reciprocate in planes perpendicular to the axis of reciprocation of the cylinder block 5, as the drive mechanism permitted by this arrangement is as simple as possible. The block is reciprocated back and forth (as by means of a cam 28, Figures 3 and 4) so as to bring the cylinder bores of the block 5 first into registry with the suction ports 11 and then into registry with the discharge ports 12, and so on. When the front piston 9 of any pair is discharging ink through its discharge port 12 and conduit 13, the rear piston 8 will be taking in ink through its suction port 11 (Figure 1). At the opposite end of the stroke of cylinder block 5, this condition is reversed, the piston 8 delivering ink to the conduit 13 while the piston 9 is withdrawing ink through suction port 11 from the ink reservoir 2. Two pistons operating in timed relation are thus used to deliver ink to each conduit.

The suction stroke of pistons 8 and 9 is accomplished by springs 14, as usual in devices of this character, while the discharge stroke is performed by a pair of bell crank cam levers 15 and 16, rotatably carried on poppets 17 and 18. The latter are threaded and carried by a right and left hand threaded rod 19, adjustable from outside the housing 7 by means of a knob 20. Turning the knob 20 in one direction causes the poppets 17, 18 and hence the pivotal axes of bell cranks 15, 16 to approach each other, while turning it in the opposite direction spreads these pivotal axes more widely apart.

The lower arms of the bell cranks 15 and 16 engage a drive cam rotated by a cam shaft 24 and having a rise 25 and fall 26, with dwells between them. Ridges 27 may be provided to keep the bell cranks and hence poppets 17, 18 from turning on the rod 19. The upper arms of bell cranks 15, 16 form cam surfaces engaging the lower ends of pistons 8 and 9 and may be given any desired profile. As shown, they are formed as approximately involute or uniform lead cams. The springs 14, before mentioned, serve to urge the lower arms of the bell cranks 15, 16 against the surface of the drive cam and these surfaces regulate the suction stroke of the pistons 8 and 9 as well as producing the discharge stroke. The surfaces engaging the piston rods are made wide enough to permit the necessary movement of the piston ends across them as block 5 reciprocates (Figure 3).

Turning the rod 19 to move the pivotal axes of the bell cranks 15, 16 closer together, will increase the stroke of pistons 8 and 9, for given angle of movement of the bell cranks, by increasing the effective moment arms about the pivotal axes, while adjusting the bell cranks 15, 16 outwardly will correspondingly reduce the stroke of the pistons.

At the same time, the parts are so mounted that the cam engaging ends of the lower arms of the bell cranks are substantially in a horizontal plane through the axis of shaft 24 and parallel to rod 19. The movement of their arms in that plane, and, hence, the angular movement of the bell cranks 15, 16, may thus be constant, apart from negligible variation in the nature of a crank error, regardless of the position of adjustment of the poppets. More importantly, the angular positions of the shaft 24 in which the suction and discharge strokes commence and end may be practically constant.

In consequence of the adjustment characteristics, just mentioned, it will be seen that the stroke of the pistons for any given conduit may be reduced, for reducing the rate of ink supply, without reducing the time duration

of the stroke. Thus, more even delivery of ink to the drum **1** is obtained than with the usual systems employed and a larger suction stroke for handling stiffer inks may also be obtained.

The dwells between rise **25** and fall **26** may be abbreviated as desired, correspondingly changing the cam **28** to synchronize the reciprocating movements of cylinder block **5** with the ends of stroke of the pistons **8** and **9**. The rise and fall **25** and **26** need not be equal in angular extent, so that practically continuous ink discharge to cylinder **1** may be had by prolongation of the discharge strokes.

What is claimed is:

1. In an inking mechaism for printing machines, and in combination, an ink reservoir, two aligned series of ink pumps, an aligned series of conduits for supplying ink from the reservoir to an ink drum, means for moving both series of ink pumps transversely of the conduits and in the direction of alignment of the ink pumps between two predetermined positions, means establishing connection between one of said series of pumps and the ink reservoir and between the other of the said series of pumps and the conduits in one of said predetermined positions, and means similarly establishing connection between the first mentioned series of pumps and the conduits and between the second mentioned series of pumps and the ink reservoir in the other of the said predetermined positions, and a cam drive mechanism for the said pumps operable to produce a suction stroke of the said pumps when in communication with the reservoir and a discharge stroke of the said pumps when in communication with the conduits.

2. The combination according to claim 1, in which the cam mechanism comprises a common cam for driving the pumps of the two said series.

3. The combination according to claim 1, in which the ink pumps are located below the reservoir, and comprising also a lubricant housing for the ink pumps and means for sealing the housing to prevent the mixing of ink into lubricant within the housing.

4. In an inking mechanism for printing machines, and in combination, an ink reservoir, a plurality of reciprocable piston pumps for supplying ink from the reservoir to an ink drum, means for moving the pumps transversely of their direction of reciprocation for establishing connection to the reservoir for a suction stroke and to a discharge for an ink supplying stroke, and a pump drive mechanism, the drive for each pump comprising a rotatable cam, a cam follower and a piston driving arm connection between the cam follower and the piston, and means for adjusting the driving connection to vary the stroke of the piston while maintaining substantially unaltered relation between the cam follower and cam, whereby the pumping rate may be varied while maintaining substantially constant the duration of the piston stroke.

5. In an inking mechanism for printing machines, and in combination, an ink reservoir, a plurality of reciprocable piston pumps for supplying ink from the reservoir to an ink drum, means for moving the pumps transversely of their direction of reciprocation for establishing connection to the reservoir for a suction stroke and to a discharge for an ink supplying stroke, and a pump drive mechanism, the drive for each pump comprising a rotatable cam, a pivotally mounted bell crank having a cam follower arm and a piston driving arm, and means for varying the distance between the reciprocating axis of the piston and the bell crank pivotal axis for varying the piston stroke.

6. In an inking mechanism for printing machines, and in combination, an ink reservoir, a plurality of reciprocable piston pumps for supplying ink from the reservoir to an ink drum, means for moving the pumps transversely of their direction of reciprocation for establishing connection to the reservoir for a suction stroke and to a discharge for an ink supplying stoke, and a pump drive mechanism, the drive for each pump comprising a rotatable cam, a bell crank having a cam follower arm and a piston driving arm, a pivot for the bell crank and means for moving the pivot transversely of the reciprocating axis of the piston for varying the piston stroke.

7. In an inking mechanism for printing machines, and in combination, an ink reservoir, a plurality of reciprocable piston pumps for supplying ink from the reservoir to an ink drum, means for moving the pumps transversely of their direction of reciprocation for establishing connection to the reservoir for a suction stroke and to a discharge for an ink supplying stroke, and pump drive mechanism, the drive for each pump comprising a rotatable cam, a bell crank having a cam follower arm and a piston driving arm, a pivot poppet for the bell crank and a screw supporting the poppet and turnable for moving the pivot transversely of the reciprocating axis of the piston for varying the piston stroke.

8. The combination according to claim 7, comprising a second bell crank and pivot poppet, as specified, the screw being right and left threaded for moving the poppets in opposite directions when turned.

References Cited in the file of this patent

UNITED STATES PATENTS

1,311,198	White	July 29, 1919
1,642,809	Granger	Sept. 20, 1927
2,147,989	Puurman	Feb. 21, 1939
2,519,106	Bobard	Aug. 15, 1950

FOREIGN PATENTS

48,927	Norway	Jan. 26, 1931