Jan. 17, 1939. W. KLINE 2,143,886

INKING DEVICE FOR PRINTING PRESSES

Filed Dec. 21, 1936 3 Sheets-Sheet 1

Fig. 1.

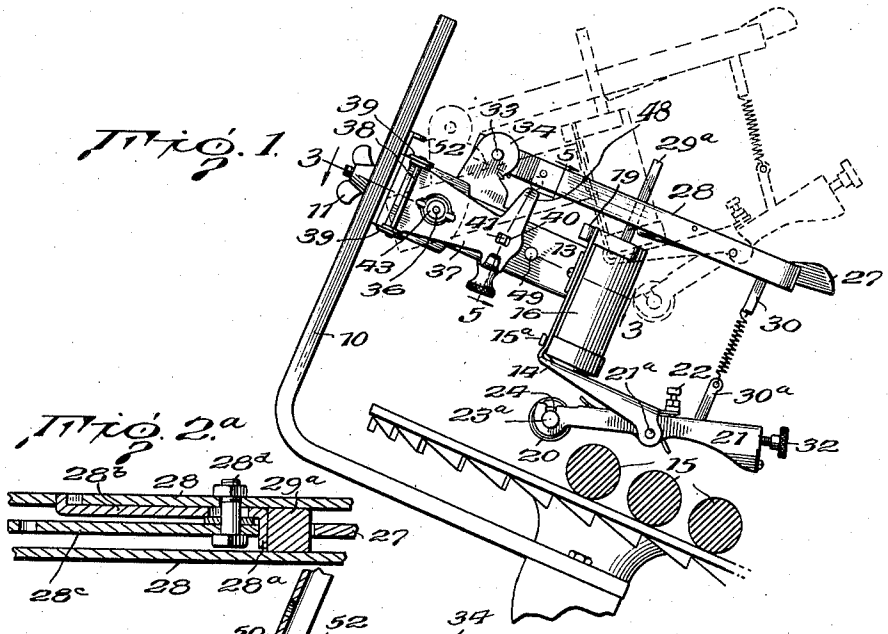
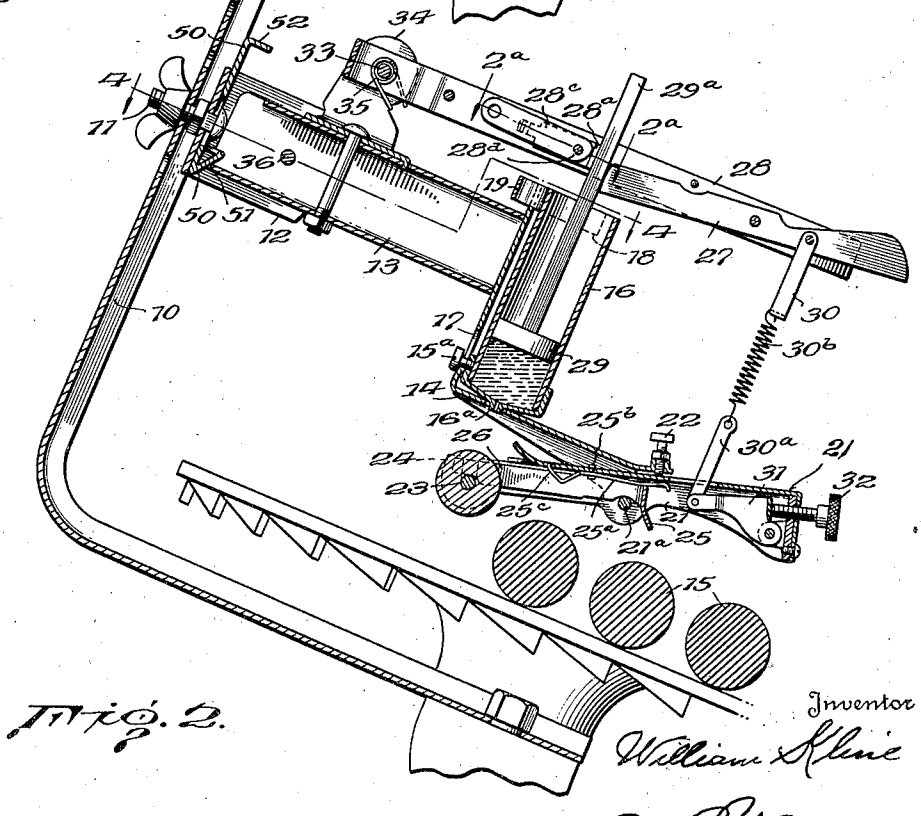


Fig. 2.a

Fig. 2.



Inventor
William Kline

By Edward P. Walton Jr.
Attorney

Jan. 17, 1939. W. KLINE 2,143,886

INKING DEVICE FOR PRINTING PRESSES

Filed Dec. 21, 1936 3 Sheets-Sheet 2

Fig. 3.

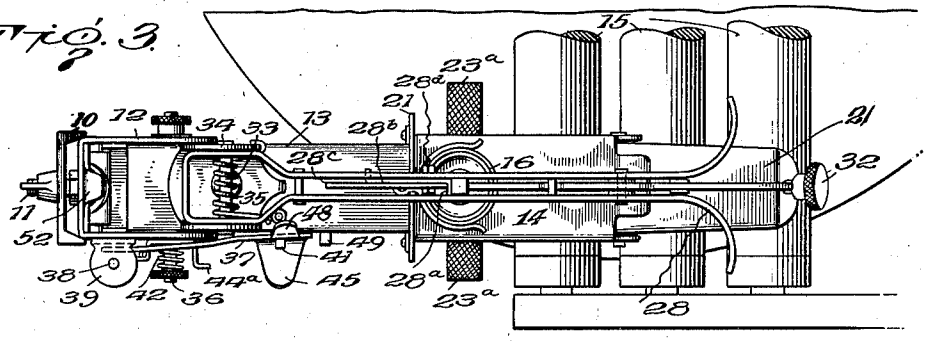


Fig. 4.

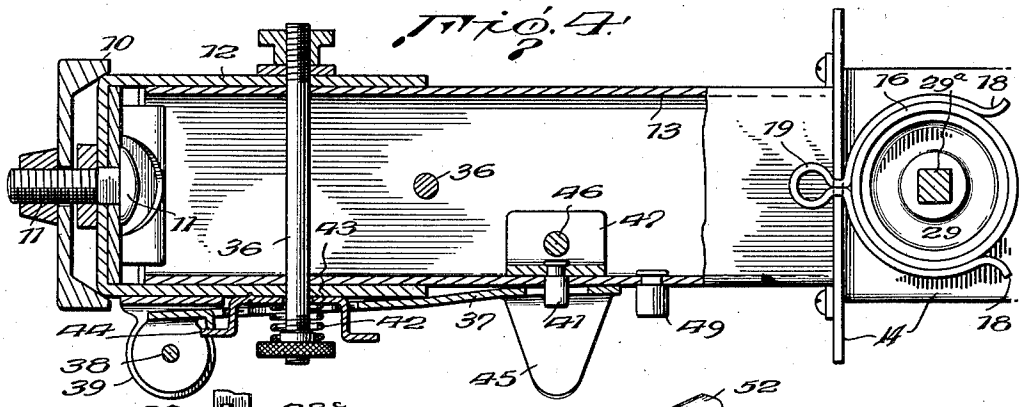


Fig. 5.

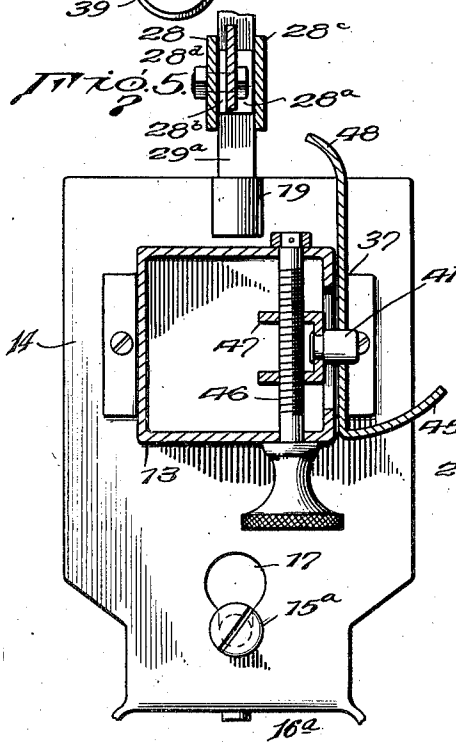


Fig. 6.

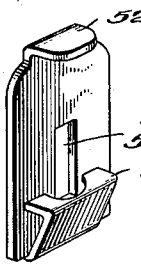
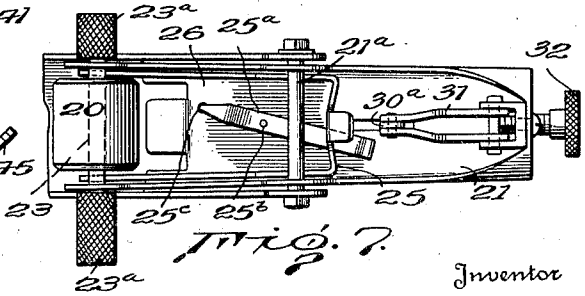


Fig. 7.



Inventor

William Kline

By Edward A. Walton

Attorney

Jan. 17, 1939. W. KLINE 2,143,886

INKING DEVICE FOR PRINTING PRESSES

Filed Dec. 21, 1936 3 Sheets-Sheet 3

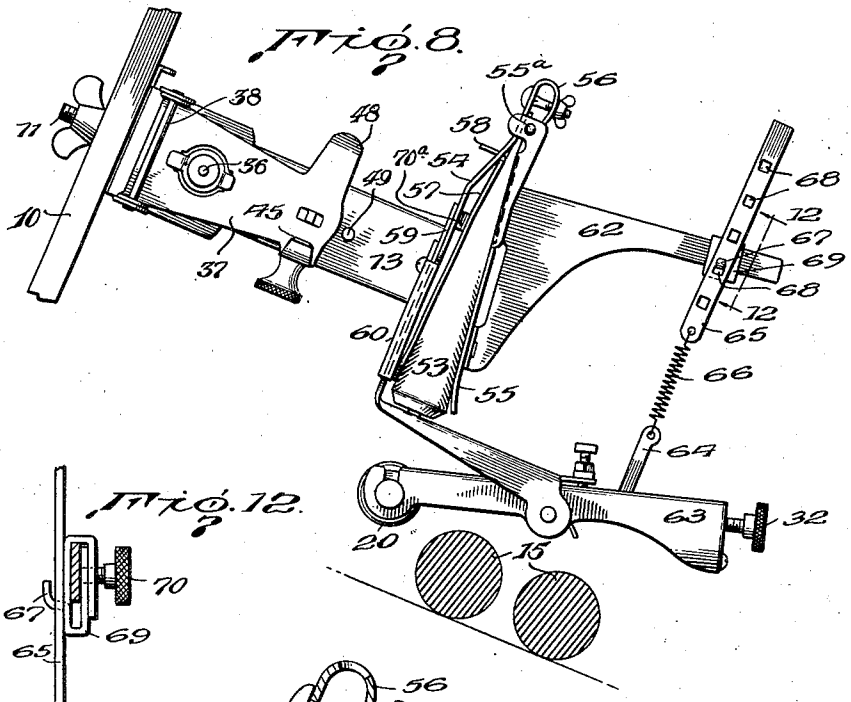


FIG. 8.

FIG. 12.

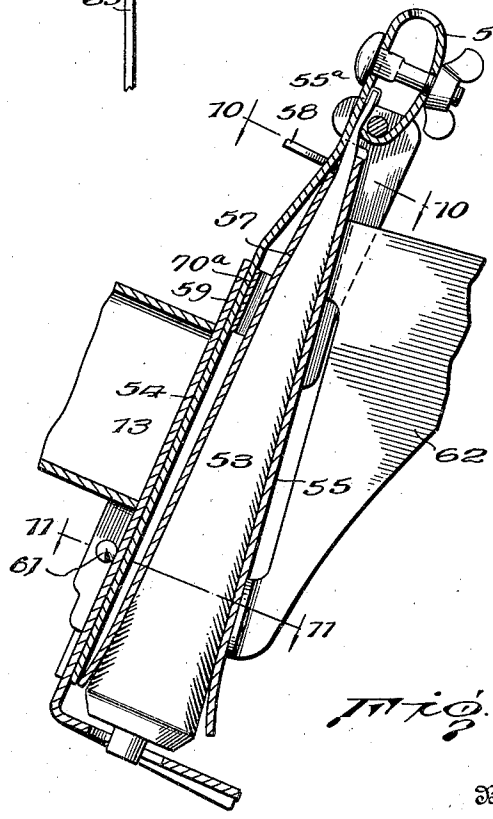


FIG. 9.

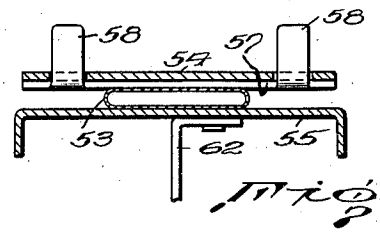


FIG. 10.

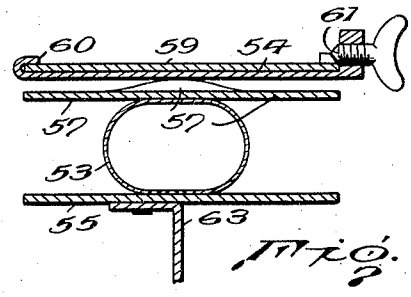


FIG. 11.

Inventor
William Kline

By

Attorney

Patented Jan. 17, 1939

2,143,886

UNITED STATES PATENT OFFICE

2,143,886

INKING DEVICE FOR PRINTING PRESSES

William Kline, Roanoke, Va.

Application December 21, 1936, Serial No. 117,066

20 Claims. (Cl. 101—366)

For good printing, there must be a proper supply of ink to the inking mechanism, so that, for platen presses, for example, just the requisite quantity for high class, uniform impressions or imprints shall be delivered by the ink rollers to the type. To secure this result, and secure it with the minimum expenditure of cost-adding time and labor, human agencies in the supply of ink to the inking mechanism must be eliminated or reduced to the minimum and as far as possible automatic, or mechanically acting devices must be employed for delivering ink from a reservoir, or source of supply, to the ink transferring instrumentalities of the press, which in platen presses, include an ink-receiving plate in the form of a rotating disk and to and fro moving composition rollers which traverse the disk and the type or form and carry a thin film of ink from disk to type. Ink-feeding mechanism, that satisfactorily achieve the ends to which I have just adverted forms the subject of my patent, No. 1,965,596, July 10, 1934, and my present invention embodies the same general characteristics of the invention of said patent, but in mechanical embodiments which more satisfactorily secure the nice supply of ink from the reservoir or source of supply and which enable the necessary adjustments or manipulations of the parts of the mechanism to be more readily and efficiently performed.

The ink reservoir or source of supply may be a compressible tube, whose walls, to expel the ink, as needed, are squeezed or collapsed, by externally applied pressure, or it may be a cylinder with rigid walls, from which, by pressure suitably applied to the contained ink the latter may be expelled, and I illustrate herein, embodiments of my present invention for utilizing both these types of reservoirs or containers.

My invention consists in whatever is described by, or is included within the terms or scope of the appended claims.

In the drawings:

Fig. 1 is a side elevation of an embodiment of my invention in which the ink reservoir is a rigid-walled cylinder.

Fig. 2 is a vertical section thereof on a larger scale.

Fig. 2*a* is a detail view in section on line 2*a*—2*a* Fig. 2.

Fig. 3 is a top plan view thereof.

Fig. 4 is a section on line 3—3 of Fig. 1.

Fig. 5 is a section on line 5— 5 of Fig. 1.

Fig. 6 is a detail view, in perspective, of the wedge part of the adjusting device for the ink transfer rolls.

Fig. 7 is a bottom plan view of the transfer roller carrier arm.

Fig. 8 is a side elevation of an embodiment of my invention using the collapsible type of ink-holder.

Fig. 9 is a vertical section of the tube holding and squeezing mechanism.

Figs. 10 and 11 are respectively sections on line 10—10 and 11—11, Fig. 9.

Fig. 12 is a section on line 12—12, Fig. 8.

I will describe in detail, first, the embodiment of my invention shown in Figs. 1 to 7.

For the convenient attachment to, and support of the mechanism from the printing press, an L-shaped arm 10 is employed having its horizontal member extended beneath the ink disk and there bolted to a convenient part of the press frame and having its vertical member reaching upward, at the rear edge of the ink-disk, to a suitable height for the support of the various parts above the disk and in proper working relation to the ink rollers. Secured to the upper portion of the vertical member, as by means of a bolt and nut 11, is a forked, or hollow bracket 12 between the side walls or legs of which is secured a forwardly extending arm 13, made tubular, or hollow for lightness, and which is rectangular in cross section. At the forward end of said arm 13, is fixed an L-shaped bracket 14 by its vertical arm and its horizontal arm extends forward at a level substantially midway between arm 13 and the usual inking rollers 15 that move over the ink disk and the type or form. The bracket 14 supports the ink cylinder 16 which rests at its bottom on the horizontal part of the bracket and at its side against the vertical member of the bracket, being detachably connected therewith, at its bottom by a headed screw 15*a* that passes through a vertical key-hole slot 17 in the vertical member of the bracket and at its top being partially embraced by opposite spring fingers 18 that extend from a loop or eye 19 detachably held in a notch at the top of the vertical member of the bracket 14. By lifting the cylinder, the screw 15*a* may be disengaged from the bracket slot, and the spring clasp at the top of the cylinder removed from the bracket notch, or the cylinder pulls forward from the clasp 18. Thus, one ink cylinder may be readily removed and replaced by another, as occasion may require, as for example, to substitute a full cylinder for an empty one.

The cylinder at the bottom, has an ink outlet 16*a*, through which ink is forced by pressure as hereafter explained to a transfer roller 20 journalled on a carrier arm 21 that is automatically

vibrated between the outlet and the rollers 15, to convey the ink taken from the outlet to the forward roller by contact therewith. Said arm 21 is pivoted at midlength by a horizontal pin 21a, between the sides of the forked forward end of the bracket 14. Normally, the roller supporting end is lowered, as shown in Figs. 1 and 2 to place the roller in the path of the composition type-inking rollers 15, and, engaged thereby as they move over the ink disk, the roller-carrying arm swings upward until the roller 20 touches or nearly touches the ink outlet and takes ink therefrom. The roller is sufficiently heavy to overbalance the arm and cause gravity to swing the roller to its lowest position. The contraction of coil spring 30b also returns lever 21 to normal position.

A set screw 22, in the threaded hole in the bracket 14, is struck by the top of the carrier arm 21 when the roller 20 is swung to its lowered position in the path of the inking rollers 15, regulating drop of roller 20 in path of roller 15.

The roller 20 is detachably mounted in the carrier arm for removal for cleaning or replacement. Its pintle 23 is placed in upwardly opening slots 24 in side pieces of the arm 21 out of which it may be lifted by handles 23a when a U-shaped slide 25 (see Fig. 7), having a leg 26, for the pintle each side of the roller, is moved to slide such legs from over the pintle. The slide is held from accidental movement that would free the pintle by a flat leaf spring 25a secured by a rivet 25b to the arm 21, so that it presses on the end cross-bar of the slide. The spring at one end is provided with a point 25c that enters a hole in the arm 21, to hold the spring from turning on the rivet, instead of using a second rivet to serve that purpose.

The swing of the transfer roller carrier arm, when the roller swings upward, is utilized to subject ink in the cylinder to downward pressure from the piston 29, in the cylinder, so that while the roller ascends to the ink outlet, pressure is applied to the ink to cause its flow from the cylinder outlet. For this purpose, a pitman-like connection is made between the carrier arm and a lever 27, pivoted between its ends to a vertically movable arm 28. The arm 28 is pivoted to the top of arm 13 and is forked to straddle the lever 27 and to straddle the piston rod 29a, which passes upward from the cylinder through such fork. The lever 27 reaches to the piston rod and has a convexly curved end to engage the adjacent side of the piston rod, so that by an action like that of a friction pawl, or clutch, will exert downward pressure on the rod, moving with its carrier arm 28, and the piston will be made to press with ink-expelling force upon the ink in the cylinder. To support the piston rod against the clutching pressure of lever 27, the forked arm 28 has a fixed, but adjustable, bearing 28a against which bears the side of the rod opposite that engaged by the rounded clutch lever end. The bearing 28a is the angled end of a plate 28b slidably bolted to the inside of one of the forks of arm 28 and adjustable by the cam end of a lever 28c pivoted between the arm forks on the bolt 28d, by which both plate and lever may be clamped after adjustment. The clutch lever 27 has a greater radius than the distance from its pivot to the piston rod on a straight line to the pivot of arm 28, so that a toggle action causes feed grip on the piston rod.

The operative pitman connection, between the roller carrier arm 21 and clutch lever 27, is a yielding one formed by two links 30 and 30a connected respectively to lever and arm, and a coil spring 30b extending between and connecting to said links. The link 30a, connected to the arm, is adjustably so connected, by being attached by a pivot pin to one end of a lever 31 whose other end is pivoted to the carrier arm 21 and engaged by a set screw 32, that it may be rocked to cause an increase or decrease on the tension of the spring 30b. It will be seen that a very gentle and delicately regulated pressure may be applied by the piston to the link so that just the right quantity of ink will be issued from the ink cylinder.

It is desirable to vary the pressure exerted on the ink because inks of different bodies or consistencies and different degrees of stiffness require different pressures to produce the regular, uniform or even flow, which is indispensible to high class printing. Stiffness of ink will vary with the weather temperature, or that of the press room, low temperatures stiffening the ink. Besides the pressure variation, which may be produced on the piston by adjusting the tension of the clutch lever pulling spring 30b, by the set screw 32, pressure variation may also be produced by changing the throw of arm 21, by adjusting set screw 22. If such screw is adjusted to allow the roller 20 to swing that end of arm 21 lower, then on the ascent of such roller, by push of the inking rollers, the other end of the arm 21, to which the spring 30b is connected, will travel lower and give, through the pull on spring 30b, a greater pull on the clutch lever 27, and, therefore, result in greater pressure on the ink by the piston, when, by reason of the body or stiffness of the ink, greater pressure is required.

The first effect of downward pull by the link and spring connections 30 and 30a with clutch lever or bar 27, is to bind or press, by upward pressure, the lever end in clutching engagement with the piston rod, and then such downward pull continuing, the lever 27 and lever arm 28 move downward and downward pressure is thereby exerted on piston rod and piston.

The lever arm 28, to which the piston rod clutching bar or lever 27 is pivoted, is itself hinged by a horizontal pivot 33, at one end, between ears 34 bolted to the top of the arm 13 and is yieldingly held in a horizontal position above the ink cylinder by a coil spring 35 mounted about the pivot 33, with one end engaging arm 28 and the other end engaging one of the ears 34. The level at which clutch bar 27 engages the piston rod can be raised by lifting lever arm 28 on its pivot. The clutch bar protrudes beyond the arm 28, for convenient grasping, and the fork ends of arm 28 are bent outward (see Fig. 3) to provide handles for swinging such arm on its pivot 33. Such change of level of clutch grip on the rod may be necessary when, after continued downward feed of the piston, arm 28 and bar 27 get too close to the top of the ink cylinder. Lifting of lever arm 28 and clutch bar also increases the tension of spring 30b, and so is another way of changing the tension of spring 30b, for increased feeding pressure on the piston when the condition of the ink requires, or the work requires increase of ink supply, as is the case with cuts and bold type which use ink rapidly.

The arm spring 35 acts as a counterpoise to prevent the weight of the arm exerting objectional pressure on the piston and feeding more

ink than is required, or light work or for feeding thin inks.

The main supporting arm 13 is pivoted by a horizontal bolt 36 to the bracket 12, on which it may be swung, with all the parts attached thereto, to the elevated position shown by dotted lines in Fig. 1 to give access to the ink disk and the inking rollers for cleaning. It is held in its lower, normal position as shown in full lines, Fig. 1, and against upward pressure by the inking rollers running under the roller 20, by a lock plate 37 (see Figs. 1, 3 and 4) which is pivoted at one end by a vertical pivot 38, secured to vertically spaced ears 39, on the side of bracket 12, and at its free end has a short horizontal slot 40 for engaging a locking stud 41, projecting outward from the side of arm 13. The lock plate 37 is movable on its pivot toward and from the stud 41. The stud 41 when extending into the opening 40, holds arm 13 positively against both downward and upward movement. The lock plate 37 is spring-held in locking engagement by a coil spring 42, on the pivot bolt 36, placed between a nut on the bolt and a bearing washer 43, loose on the bolt, and by an outturned lug 44, which engages the outerside of the lock plate and yieldingly presses it into locking engagement with the stud 41. To conveniently move the lock plate 37 from the stud, against the spring pressure, the lock plate has a handle-forming projection 45. A lug 44*a* on washer 43, serves as a stop for the latch 37. The stud 41, is connected with an adjusting screw 46, by which its vertical position may be adjusted. Said screw 46 is swivelled to the arm 13, and passes through a nut 47 to which the stud is attached. See Fig. 5. By this adjustment, the proper position of roller 20, with relation to the ink outlet may be assured.

The lock plate 37 has a vertical extension 48, the top of which serves to support the arm 13 when raised to the position shown by dotted lines in Fig. 1, the arm having on its side a stud 49, that rests on the top of the extension, as shown in Fig. 1.

Because of variation in sizes of printing presses, or for other reasons, adjustment is necessary, or may be desirable, of the position of the ink outlet of the cylinder relative to the transfer roller, and holding that adjustment is important. For this purpose, I may employ the vertically adjustable wedge 50 shown in Figs. 2 and 6, arranged so that its inclined face may be engaged by the end edge 51, of the pivoted arm 13. The wedge is held in adjusted position by the same bolt that secures the bracket 12 to the L-shaped arm 10, said bolt having a squared portion that engages a vertical slot 50*a* in the wedge. A projecting lip 52 at the top of the wedge shank affords a finger hold for sliding the wedge in the adjusting operation. The wedge incline bearing against the arm edge, holds the arm in the lower or working position to which it is swung on its pivot. It prevents the arm dropping too low, in the event of failure of the lock plate to perform its function.

When it is desired to inter-change ink rollers, as when colors and inks are to be changed, or to refill an emptied container, the spring 39*b* is disconnected from the link on clutch bar 27, and lever arm 28, is swung on its pivot to a vertical position in which it is held by its spring 35. In this position, the ink holder in use is accessible for removal and replacement, or for substitution of another.

Referring now to Figs. 8 and 12, it will be found that the substantial difference from what is shown in Figs. 1 to 7, is in the employment of a collapsible ink tube 53, instead of the rigid wall cylinder, and the employment of suitable squeezing devices for such tube. The tube is placed vertically between a fixed clamp or jaw 54, fixed to the supporting arm 13, and a movable clamp or jaw 55, pivoted by pin 55*a*, at its upper end to the fixed jaw. The tube is held firmly by a vise-like grip on its flat closed upper end by a nut and screw actuated clamp 56, formed by bending the top portion forward, down and rearward to provide a loop, with a tube-engaging edge at the end of the bend. The fixed clamp or jaw has for contact with the tube a vertically extending plate 57, which has a supporting connection therewith by two lugs 58 slidably projecting through holes in said jaw 54 (Figs. 9 and 10) so that some play of said plate 57 may occur. Said jaw 54 is attached to a plate 59 fixed to the forward end of arm 13, by a bent lip 60 that overlaps the plate 59 at one side, and by a set screw 61, that overlaps the opposite edge of plate 59.

From the movable jaw projects an arm 62, which at its outer free end has a pitman connection with a roller carrier arm 63, similar to the roller carrier arm 21 of Figs. 1, 2 and 7. The pitman connection includes two links 64 and 65 and a coil spring 66, as in Figs. 1 and 2. The link 65 is connected to the movable jaw arm 62 by the engagement with a hook 67, on said arm of any one of a series of holes 68. That hole is selected for engagement with the hook which will give a little tension on the contractile coil spring 66, when the movable jaw is firmly against the tube of ink, with the neck end of the tube in the hole in the horizontal supporting plate. The hook 67 is at the side of a slide 69 on the narrow free end portion of the jaw arm 62 and is held at the desired position on said arm by a set screw 70. See Figs. 8 and 12.

As ink tubes vary in length, the clamp plates or jaws are vertically slidable upon the supporting plate 59, this being provided for by the bent lip 60, and screw 61, described above. The loosely connected plate 57, shown in Figs. 8 to 11, is employed when a tube is approximately half empty, and is supplemented by a leaf spring 70*a* (see Fig. 9), interposed between such plate 57, and the stationary jaw plate 54.

When the roller carrying arm 63 is rocked to carry the roller upward, the consequent downward movement of the other end of the arm results in placing sufficient tension on the spring 66 of the pitman connection to expel from the tube the precise quantity of ink proper to be delivered to the rollers.

Adjustment to secure increased tension on the pitman spring may be had by shifting slide 69 farther out on the jaw arm 62, because of the leverage increase thereby gained, and also by turning thumb screw 32 to right which acts by a downward pull of link 64 attached to bell crank lever 31 as shown in Fig. 2.

When the diminishing supply of ink affects the proper effective tension of the spring below the point of regulation by the lever adjusting screw 32, the link 65, is shifted to place a lower hole 68 on the hook 67.

The collapsible tube form of ink holder, possesses certain advantages, such as convenience in handling, but there are occasions when ink in bulk is preferably used, as when remixing of the

inks is required for certain jobs, and when different kinds and colors of inks are required. It is to meet these requirements, that I embody my invention in forms available for the collapsible tube containers and the rigid wall cylinders. The rigid wall cylinders are especially advantageous, when different colors or kinds of ink may be required and as convenient holders for left over inks that may be later used. Thus a number of such cylinders can be supplied, with simple removable caps to close both ends of the cylinder that serve to keep the ink fresh and clean, and are removed when the cylinder is installed in the feeder, and is used with the special bottom having the ink outlet, or any special cap or cover, which the design of the machine requires.

My invention may be otherwise embodied than in the forms shown in the drawings, and accordingly, I do not confine my protection to those forms.

What I claim is:

1. An ink feeder for the inking mechanism of printing presses, comprising an ink holder, with an outlet to deliver ink to the inking mechanism and means to subject ink in the holder to expelling pressure comprising two members, one to impart and the other to receive motion, and a yieldable connection between such members which includes a spring with means to adjust the tension of the spring.

2. An ink feeder as in claim 1, in which the yieldable connection includes links connected to the two members, a spring connecting the links, and means to change the tension of the spring.

3. In an ink feeder for a printing press having an inking mechanism that includes ink-applying means, said feeder comprising an ink holder above the latter, an ink holder support, an arm movably connected with said support and extending above the ink holder, means for producing pressure on ink in the holder, including a pivoted lever supported by said arm, and a second lever carrying an ink transfer roller in the path of said ink-applying means and movable thereby towards the ink holder, to take ink therefrom, and a variable operative connection between the two levers.

4. An ink feeder, as in claim 3, in which the ink holder is a cylinder with a pressure piston therein having a rod, and one of the two levers has frictional feeding contact with said rod at one side thereof, and the arm has a rod bearing on the opposite side from said lever, to support the rod against thrust from the lever.

5. In an ink feeder for a printing press having an ink-applying means, said feeder comprising an ink holder for feeding ink to such mechanism, a vertically movable support for such holder, and holding means for such support comprising a spring-held pivoted locking plate and a cooperating member on the support.

6. An ink feeder, as in claim 5, in which the cooperating member is a vertically adjustable stud.

7. In an ink feeder for a printing press having inking mechanism, said feeder comprising a vertical ink-holding cylinder having an ink outlet at the bottom, a piston in said cylinder and having a piston rod, means which act on said rod to move the piston, a support for the cylinder and having a notch therein, and means detachably connecting said cylinder to its support including a cylinder encircling clamp having a part to engage the notch in the support.

8. An ink feeder for printing presses comprising a pressure receiving device for imparting feeding pressure to the ink, and means to impart pressure to said device comprising a rod, a movable arm having two members that engage said rod on opposite sides, at least one of said members being movably connected with said arm, and press-actuated means operatively connected with said movable member, the latter being thereby movable relative to said arm and said rod, and said arm and said movable member being movable together.

9. An ink feeder as in claim 8, in which the arm and the movable member constitute a toggle that acts on the rod.

10. An ink feeder, as in claim 8, in which the movable arm is pivoted, and having a support to which such arm is pivoted, and said movable member has a pivotal connection with said arm.

11. In an ink feeder for a printing press, the combination of inking mechanism that includes ink receiving and applying roller, an ink holder with an outlet relative to which said roller moves to and fro, a pivoted vertically movable support for such holder, adjustable holding means for said support to fix the position of such holder to secure proper working relation of roller and holder outlet, and locking means for said support to secure the support when in position, and to place the holder outlet in proper working relation to the roller.

12. An ink feeder for inking mechanism of printing presses comprising means to support a collapsible ink holding tube in position to deliver ink to said mechanism, means to subject said tube to collapsing pressure comprising a movable tube-engaging device and a press-actuated means to press said device against the tube, a link adjustably connected to said device, a yieldable connection between the link and said press-actuated means, and means on the press-actuated means for varying the yieldability of said connection therewith.

13. An ink feeder for printing presses having inking mechanism, comprising means adjustably to support a collapsible ink-holding tube in position to deliver ink to said mechanism, said means comprising an element shiftable to different distances from the inking mechanism, according to the tube length, and means to subject the tube to collapsing pressure.

14. A device as set forth in claim 3, further characterized by an adjusting means carried by said second lever for adjusting the tension of said yieldable cooperative connection between the said two levers.

15. An ink feeder as set forth in claim 3 in which the ink holder is a cylinder with a pressure piston therein having a rod, and one of the two levers has frictional feeding contact with said rod.

16. An ink feeder for printing presses having inking mechanism, said feeder comprising means to support a collapsible tube ink-holder in position to deliver ink to said mechanism and including a pair of opposed jaws, a clamp on said means to receive and bind the closed end of said tube to prevent ink from being forced therethrough, and means to subject said jaws to pressure for collapsing said tube.

17. An ink feeder as set forth in claim 16 wherein the said clamp comprises a loop formed at the end of one of said plates, means whereby the loop may be opened and closed and the other jaw being articulate in said loop.

18. An ink feeder for the inking devices of printing presses, comprising an ink holding cyl-

inder having an outlet therein to deliver ink to the inking mechanism, a piston in the cylinder to subject the ink therein to an expelling pressure, a piston rod extending from said piston and having a smooth surface portion, means for operating said rod to feed the piston into the cylinder for expelling said ink, said means including an element arranged to frictionally clutch the smooth surface portion of said rod, when said means is operated for moving the rod to transmit pressure to the ink, and press-actuated means for operating said feeding means.

19. In an ink feeder as set forth in claim 18 in which there is a variable connection between the rod feeding means and the press-actuated means, whereby the amount of feed of the piston may be regulated.

20. In an ink feeder as set forth in claim 18 in which a press-actuated means is intermittently operated and said rod feeding means has an ultimate motion longitudinally of said piston rod, said clutching element having clutching contact with the rod in one direction only whereby the piston is progressively moved into the cylinder.

WILLIAM KLINE.