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 2,830,555 4/1958 Barrett..... 101/363 UX  
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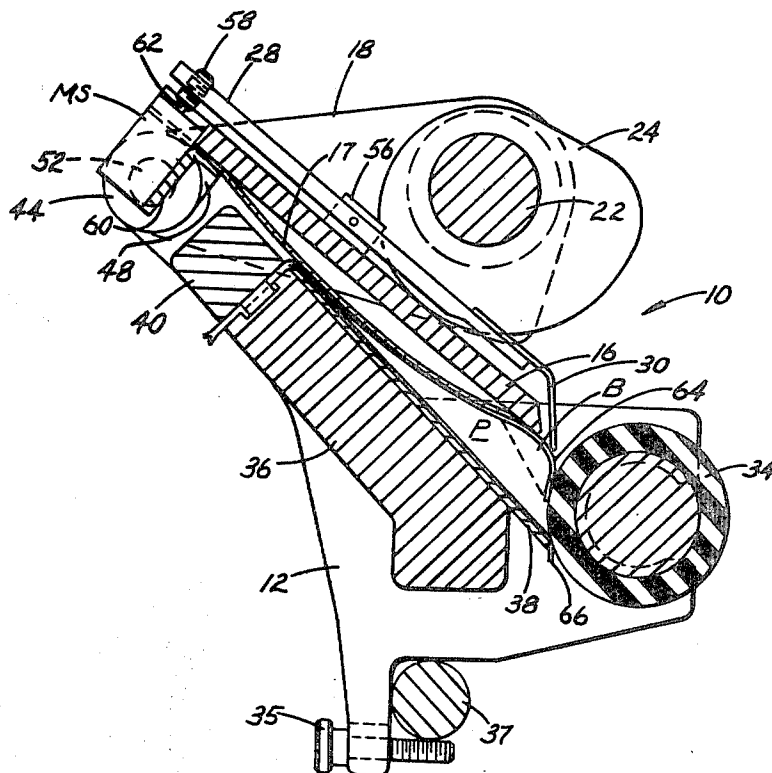
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[54] **INK FOUNTAIN FOR DISPENSING PACKAGED INK**  
 1 Claim, 4 Drawing Figs.

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 101.25; 222/55, 56, 64, 95, 103

[56] **References Cited**  
 UNITED STATES PATENTS  
 2,065,279 12/1936 Kline..... 101/366 X  
 2,399,688 5/1946 Metzner et al..... 137/386 X  
 2,568,332 9/1951 Genovese..... 222/56 X

**ABSTRACT:** An ink fountain for a printing or duplicating machine for use with packaged ink whereby the package, which has a flexible wall, is placed into the fountain and the ink is dispensed under pressure from the package directly to an ink fountain roller. The pressure causes a bead of ink to be formed under the flexible wall, and the amount of pressure permits the wall to assume a distended position or a retracted position indicative of the amount of ink in the ready supply of ink adjacent the fountain roller. A sensing means is provided for continuously detecting the position of the flexible wall during machine operation. Power means actuates a mechanical means to force ink from the package into the bead and toward the fountain roller when the sensing means detects the retracted position of the flexible wall of the package and deactuates the mechanical means to terminate movement of the ink from the package into the ready supply when the sensing means detects the distended position of the flexible wall of the package.



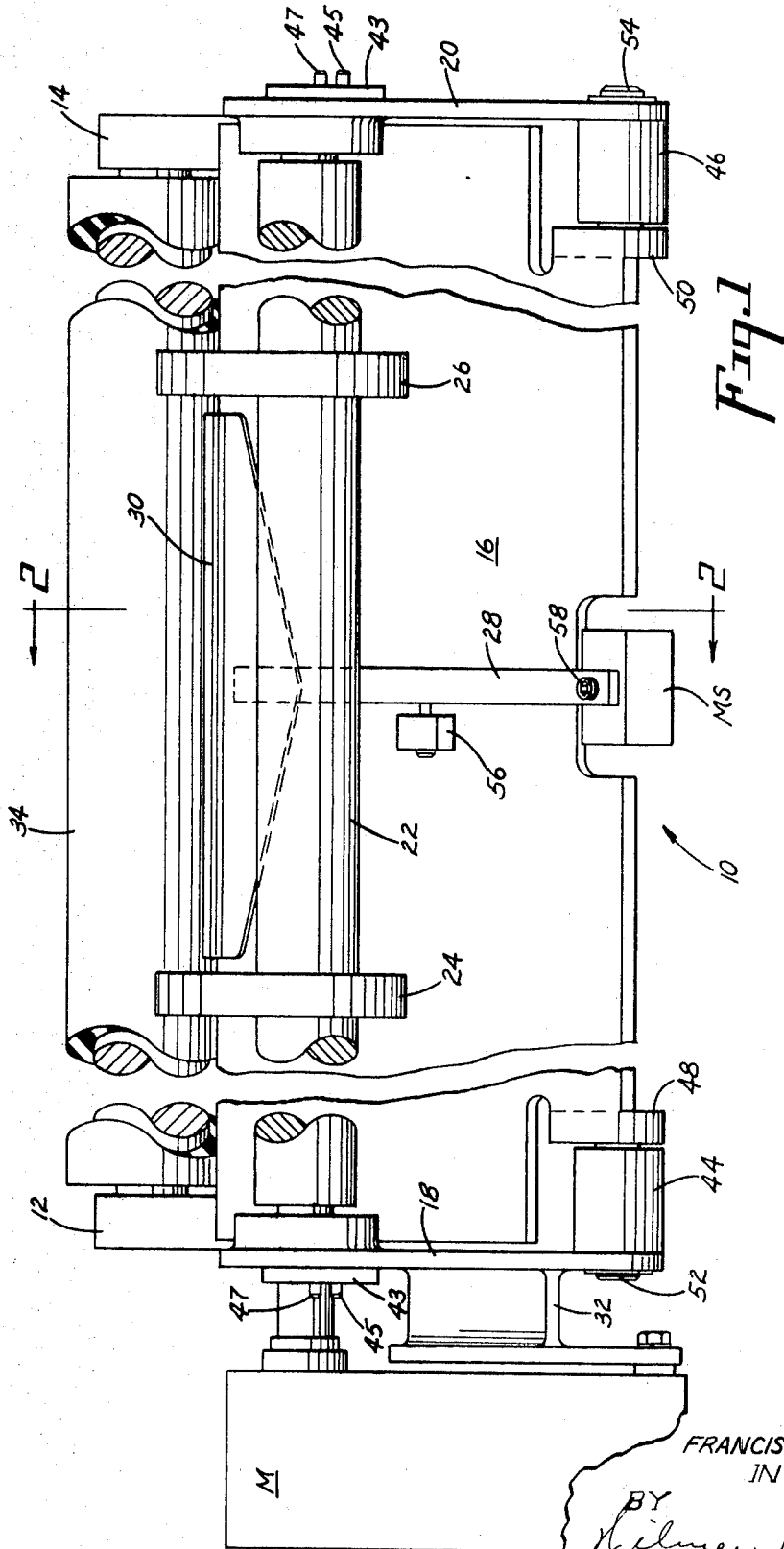
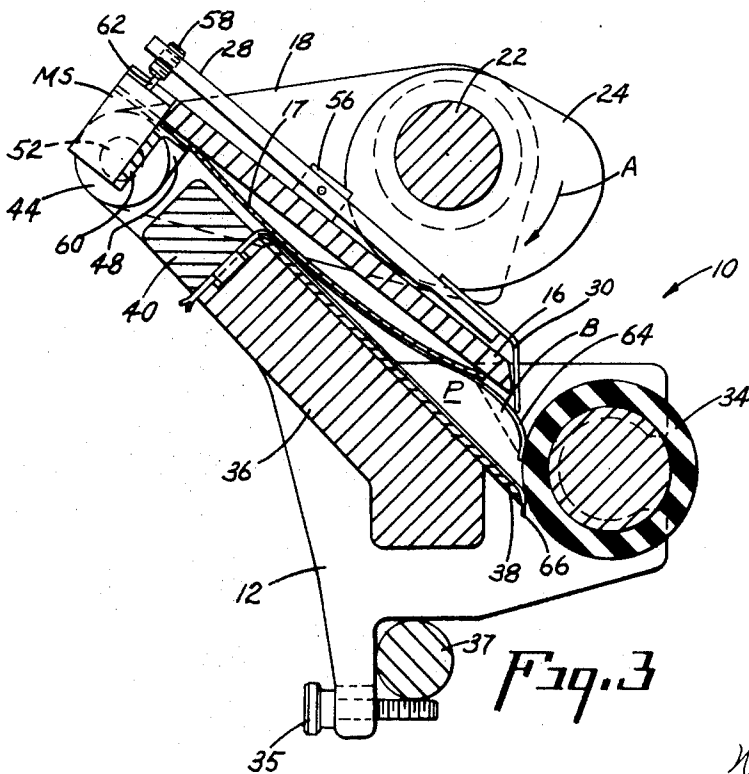
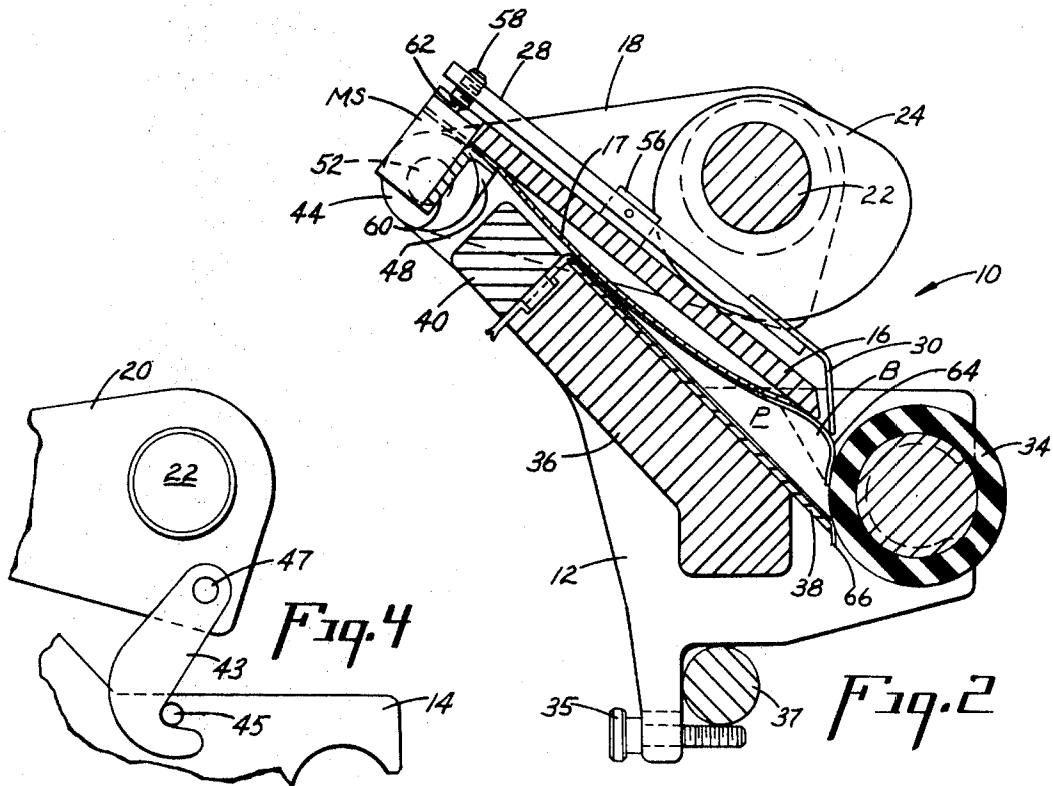


Fig. 1

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## INK FOUNTAIN FOR DISPENSING PACKAGED INK

### BACKGROUND OF THE INVENTION

Among the wide variety of ink fountains on printing and duplicating machines in use today, it is customary practice to supply or replenish the ink in the fountain as by transferring the ink from a can, tube, or the like to the ink fountain of the machine. This manner of transferring ink from the container to the fountain is, of course, effected manually and, therefore, often-times results in the operator's having ink-soiled fingers and clothing.

In addition, such practice requires that the ink be placed directly in the ink fountain and fed therefrom to the fountain roller. Accordingly, the fountain becomes contaminated with ink resulting in a time-consuming and messy clean up operation. Additionally, because the ink in the fountain is exposed to the atmosphere, it is subject to skinning, and is exposed to dust, dirt, lint and other foreign matter in the air which settles on the surface of the ink. As will be appreciated, this foreign matter in the fountain is likely to be passed through the ink train and onto the printing plate and often creates problems in attempting to obtain high quality duplicated copies.

A novel ink fountain and ink package are disclosed in U.S. Pat. Nos. 3,354,823 and 3,316,839, assigned to the common assignee hereof, and the disclosures therein are incorporated in this application by reference thereto. As shown therein, the ink fountain is adapted to receive a package of ink and to dispense the ink directly from the package to the ink fountain roller. Such an arrangement has the advantages of protecting the fountain and adjacent parts from coming into contact with the ink, thereby greatly reducing the time required and messy operation associated with cleaning conventional-type ink fountains. Further, since the fountain accepts ink in a packaged condition, the ink in the fountain is not exposed to the atmosphere and, therefore, is protected against skinning and from foreign particles in the air which might accumulate in the ink fountain. This results in a highly improved capability for the production of high quality duplicated copies.

It is an object of the present invention to provide an improvement to the ink fountain of U.S. Pat. No. 3,354,823, whereby the ink fountain can be readily controlled to effect proper feeding of ink and automatically maintains accurate control of the ink feed during machine operation.

Another object of the invention is to provide a sensing means for detecting the amount of ink being dispensed from the package to the ink fountain roller and, in response thereto, activating or deactivating a control means so as to maintain a uniform supply of ink at the fountain roller.

Another object of the invention is to provide power means for applying uniform pressure to the package so that a predetermined amount of ink, as displaced from the package, is maintained at the ink fountain roller without operator intervention.

Other objects, features and advantages will appear hereinafter as the description proceeds.

### DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan of an ink fountain in accordance with the practice of the invention;

FIG. 2 is a section on line 2-2 of FIG. 1, showing an ink package in the fountain and a means for sensing the amount of ink in a bead of ink formed adjacent the open end of the package;

FIG. 3 is similar to FIG. 2 but shows the sensing means in another position; and

FIG. 4 is a side elevation of a portion of the ink fountain, broken away, showing a latching means for locking the ink fountain in a closed position.

### DESCRIPTION OF THE PREFERRED EMBODIMENT

As mentioned hereinabove, the invention disclosed is an improvement to the ink fountain shown in U.S. Pat. No. 3,354,823. Accordingly, the drawings have been simplified by omitting structure nonessential to the understanding of the invention, and the following description has been condensed so as to provide a complete disclosure and full understanding of the present invention without burdening the specification with detailed material described in the above patent and not essential to the invention.

An ink fountain according to the invention is indicated generally at 10 in FIG. 1 and comprises a pair of main sideplates 12 and 14, and an upper portion including a pair of supplementary sideplates 18 and 20, pressure applying means comprising a pressure plate 16, a spring plate 17 (FIG. 2), a shaft 22 rotatably supported in sideplates 18 and 20, and a pair of cams 24 and 26 secured on shaft 22. Also included in the upper portion of the fountain is a sensing device including an actuator arm 28 and a sensing finger or blade 30. A motor M is secured to sideplate 18 by means of a mounting bracket 32, and is adapted to provide a direct drive to shaft 22.

An ink fountain roller 34 is rotatably supported in the printing machine sideplates (not shown) and the ink fountain is releasably mounted between the machine sideplates by positioning main sideplates 12 and 14 over the ends of fountain roller 34, as fully shown and described in U.S. Pat. No. 3,354,823. As shown in FIGS. 2 and 3, the fountain is also provided with a pair of clamping screws 35 (only one of which is shown in the drawings) to hold the fountain firmly down against a tie rod 37 of the printing machines.

With reference to FIGS. 2 and 3, ink fountain 10 also includes an anvil 36 mounted between and secured to sideplates 12 and 14, an ink metering blade 38 mounted in any suitable manner on the anvil 36, and a movable clamping bar 40. A disposable ink package P is also shown in FIGS. 2 and 3, and includes a closed end by which clamping bar 40 retains the package in the fountain, and an open end adjacent the fountain roller 34 from which ink is dispensed from the package. A package of this kind, for example is shown and described in U.S. Pat. No. 3,316,839.

The upper portion of the ink fountain, including sideplates 18 and 20 and pressure plate 16, is adapted to be swung to an open position (not shown) for receiving and removing an ink package, and a closed position as shown in the drawings for dispensing ink from the package to the fountain roller. Latching means, shown in FIGS. 1 and 4, is provided at each end of ink fountain 10 for locking the upper section of the fountain to sideplates 12 and 14 independently of the pressure plate when the fountain is in closed position. Since both latching means are substantially the same, only one will be described. As shown in FIG. 4, a hook 43 is pivotally mounted on a pin 47 provided in sideplate 20, and cooperates with a pin 45 fixed in sideplate 14. In this way, the upper portion of the fountain is maintained in a locked condition to enable the pressure applying means to be effective, and the latching and unlatching of the fountain can be readily accomplished when it is desired to close or open the fountain respectively.

The means for pivoting the upper portion of the fountain between open and closed positions may include, for example, bushings 44 and 46, FIG. 1, secured to sideplates 18 and 20, and lugs or ears 48 and 50 provided on pressure plate 16. A pin 52 is positioned through ear 48, bushing 44, and sideplate 18. A similar pin 54 is positioned in ear 50 and other bushing 46, and sideplate 20. Pins 52 and 54 are held against endwise movement by conventional retaining means. If desired, pressure plate 16 may be provided with means which coax with shaft 22 so that when the upper portion of the fountain is pivoted to its open position, the pressure plate will be moved simultaneously therewith.

The sensing device referred to hereinabove will now be described. As shown in the drawings, actuator arm 28 is pivotally mounted on a block 56 fixed to the top surface of

pressure plate 16. Sensing blade 30 is secured to the end of actuator arm 28 adjacent fountain roller 34, and the other end of the actuator arm is provided with a projection which may be in the form of an adjusting screw 58. A microswitch MS is fastened to a bracket 60 provided on pressure plate 16, and includes a plunger 62 adapted to be acted upon by the screw 58 for opening and closing the switch.

With reference to FIGS. 2 and 3, it will be seen that ink package P includes an upper flexible or supple wall 64 which is in contact with sensing blade 30, and a lower wall 66 which rests on metering blade 38. While the entire package P comprises a flexible plastic envelope containing ink, as fully described in U.S. Pat. No. 3,316,839, reference herein to a flexible wall of the package is directed primarily to upper wall portion 64, since it is the flexibility of the upper wall portion which is associated with the operation of the invention disclosed herein.

Flexible wall 64 is movable between a distended position with respect to the lip of the pressure plate 16, as shown in FIG. 2, and a retracted position with respect to the pressure plate lip, as shown in FIG. 3. These positions are in relation to the degree of forward squeeze being applied to the package contents at any given condition of package fullness.

In FIG. 2 there is shown a bead B of ink formed under flexible wall 64 in its distended position adjacent the open end of package P. The package P may be considered as including a storage portion or replenishing location remote from the fountain roller 34 and a ready supply portion adjacent and in dispensing contact with the roller 34. The bead B constitutes the upper section of the ready supply portion, and its size (gauged with respect to the level of the pressure plate) gives a mechanical indication of the extent and adequacy or incipient depletion of the ready supply. Formation of the bead is caused initially, e.g. when a fresh package of ink is placed in fountain 10, by pressure of spring plate 17 against package wall 64. Continued pressure is applied in a manner to be described presently. However, attention is first directed to FIG. 3 wherein bead B is shown to be much reduced in size and wall 64 is in its retracted position, thereby indicating a levelling off of the ink supplied to fountain roller 34 due to usage of ink in the normal printing operation and the desirability of replenishing ink in the bead adjacent the fountain roller.

In the operation of a printing or duplicating machine containing an ink fountain of the type shown, ink package P is placed in the fountain and the closed end of the package is secured in position by clamping bar 40. The upper portion of the fountain is then moved to the closed position shown in FIGS. 2 and 3. In this position, spring plate 17 is pressed against the package and is effective to force some of the ink from the storage portions of the package toward the fountain roller thereby causing bead B to form and flexible wall 64 of the package to reach the distended position shown in FIG. 2. As long as a sufficient supply of ink is maintained in ready supply the flexible wall will maintain sensing blade 30 in a raised position relative to the pressure plate 16, as shown in FIG. 2, and actuator arm 28 will be held against downward pivoting movement on the pressure plate. Thus, screw 58 holds plunger 62 of microswitch MS depressed and the switch remains open.

During the time the printing machine is operating and ink is being consumed in the printing of copies, the supply of ink in the ready supply portion gradually decreases to the point where replenishment is desirable. This depletion is indicated by a shrinkage in the size of bead B. Unlike conventional ink systems wherein adding ink to the fountain is effected manually, the novel arrangement disclosed provides automatic replenishment of the ink adjacent the fountain roller. For example, flexible wall 64, which is in contact with the upper portion of bead B and may be described as resting thereon, follows the level of the bead as the ink is gradually withdrawn by fountain roller 34. Such movement of wall 64 continues until it reaches substantially the position shown in FIG. 3. Sensing blade 30 follows movement of wall 64 to the

position also shown in FIG. 3. In this position, sensing blade 30 causes actuator arm 28 to pivot in a clockwise direction, as viewed in FIG. 3, thereby raising screw 58 away from plunger 62, actuating switch MS and completing a circuit to start motor M.

Operation of the motor drives cam shaft 22 to rotate cams 24 and 26 in the direction of arrow A in FIG. 3. As the cams rotate against pressure plate 16, the pressure plate is caused to pivot about pins 52 and 54 and spring plate 17 applies a squeeze to the ink package to force an additional supply of ink from the storage portions of the package toward the ready supply adjacent the fountain roller. Such squeezing action continues until bead B is reformed and flexible wall 64 is restored to a position approximately as shown in FIG. 2. All the time wall 64 is being restored, sensing blade 30 is being forced upwardly relative to the pressure plate 16 since the sensing blade, as pointed out hereinbefore, rides on the surface of the wall which, in turn, is in contact with the upper portion of bead B. When sensing finger 30 reaches its upper limit, actuator arm 28 is pivoted in a counterclockwise direction until screw 58 depresses plunger 62, opening switch MS, thereby discontinuing power through the circuit and shutting off motor M. The pressure means remains in such position until the supply of ink at the fountain roller again requires replenishment as detected by sensing blade 30 superimposed on flexible wall 64 of the ink package. When the predetermined low level of ink is detected, the unit is again activated to force additional ink into bead B and replenish the supply of ink at the fountain roller.

It should be pointed out the two positions of sensing blade 30 and flexible or supple wall 64 shown in FIGS. 2 and 3, are intended to illustrate, respectively, the approximate upper and lower positions of the parts at the stopping and starting of the power source to control the amount of ink being made available to ink fountain roller 34. The movement of such parts between such positions may occur any number of times before ink package P becomes empty, depending on various conditions, such as, for example, on how closely it is desired to control the amount of ink reaching fountain roller 34, on the quantity of ink in a full package, on the amount of ink being taken from fountain roller 34 due to the inking demands of the copy being printed, etc.

From the foregoing, it will be seen that the invention provides a novel arrangement for automatically maintaining an adequate supply of ink at the fountain roller without machine operator intervention. The sensing device and the pressure applying means are readily adapted to maintain a predetermined amount of ink being fed to an ink fountain roller, and the packaged ink provides a considerable advantage over conventional inking systems in the way to clean handling and reduced clean up time of the ink fountain.

I claim:

1. A device for dispensing ink in a printing machine which comprises:

an ink fountain roller;

a squeezable ink package with walls of supple material substantially equal in length to the fountain roller, having a dispensing mouth running the length thereof along one side whose margins are in continual contact with the surface of the fountain roller, said package including adjacent the dispensing mouth a supple wall portion in enclosing intimate contact with the surface of the contained ink;

pressure means overlying the package for applying a progressive squeezing action along the entire length of the package to move the ink therein towards the dispensing mouth of the package and the fountain roller, said pressure means terminating short of the fountain roller to provide an open space between the pressure means and the ink fountain roller to expose a portion of said supple ink contacting wall portion of the package to permit its distension and retraction in response to the amount of ink adjacent the fountain roller;

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sensing means riding on said ink contacting wall portion in the open space between the pressure means and the ink fountain roller for detecting the position of the wall portion and giving an indication thereof;  
power means for actuating said pressure means; and  
means, responsive to an indication from said sensing means that the ink contacting wall portion is in retracted posi-

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tion for activating said power means to cause the pressure means to apply a squeezing action to the package, and responsive to an indication from said sensing means that said ink contacting wall portion is in distended position for deactivating said power means to terminate the squeezing action of the pressure means on the package.

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