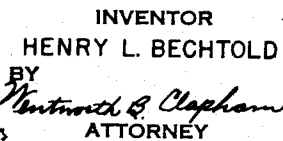


Filed May 14, 1949

CIGARETTE MACHINE INKING MECHANISM

2 Sheets-Sheet 1



Oct. 27, 1953

H. L. BECHTOLD

2,656,789

CIGARETTE MACHINE INKING MECHANISM

Filed May 14, 1949

2 Sheets-Sheet 2

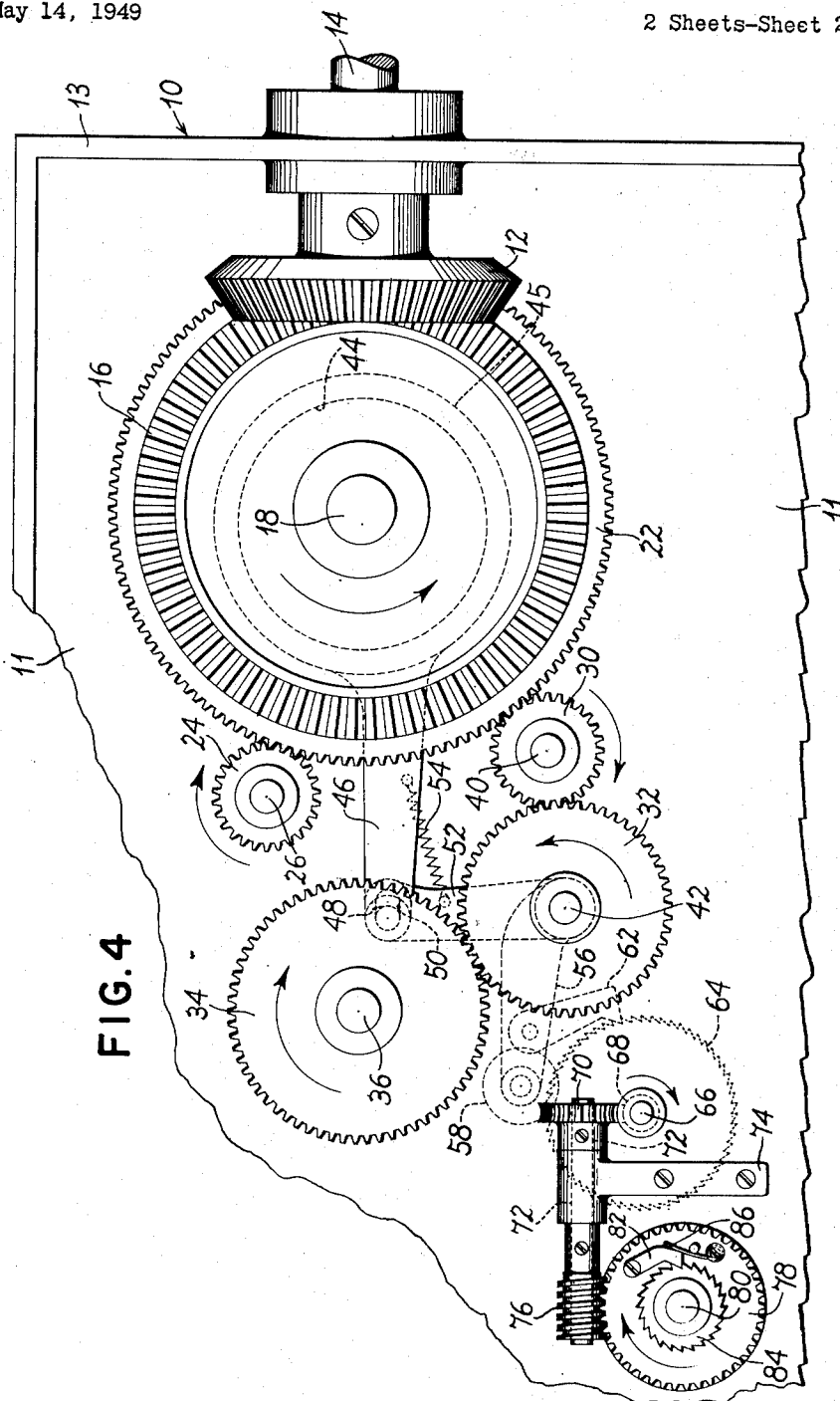


FIG. 4

INVENTOR
HENRY L. BECHTOLD
BY
Wentworth B. Clapham
ATTORNEY

Patented Oct. 27, 1953

2,656,789

UNITED STATES PATENT OFFICE

2,656,789

CIGARETTE MACHINE INKING MECHANISM

Henry L. Bechtold, Grantwood, N. J., assignor to
American Machine & Foundry Company, a corporation of New Jersey

Application May 14, 1949, Serial No. 93,237

10 Claims. (Cl. 101—350)

1

This invention relates to inking mechanisms for printing devices, and more particularly to an improved type of inking mechanism in which the ink supply is contained within a collapsible container from which the ink is progressively expressed in timed relation with the operation of the printing device.

The invention relates to an inking mechanism designed primarily for use in cigarette machines, although by nature of its construction and operation, it can find ready application in other fields of printing.

The invention solves the problem of insuring a continually fresh supply of ink, and thereby makes possible greatly improved evenness of feed and uniformity of distribution of ink to the printing device with which it is used. This is because mechanism is provided which keeps the ink free from contact with the air until it is actually about to be transferred to the ink distributing elements of the inking mechanism. In this manner, caking and hardening of ink, which occurs in inking mechanisms using open wells or fountains, is substantially eliminated, and also contamination due to the presence of dust and dirt in the air is prevented.

An object of the present invention is to provide an inking mechanism which substantially assures that the ink will both be uniform and fresh when fed to the distributing rollers because it is not exposed to the air, and dust particles cannot enter it; further, there is little or no chance for it hardening before it is transferred to the printing type.

The invention also contemplates the provision of means which automatically cuts off the flow of ink through the orifice or aperture in the ink delivering device or nozzle, when the machine with which the inking mechanism is associated, is stopped. Mechanism is provided to seal off the ink supply, thereby keeping it fresh and clean until the machine is started again, at which time the ink supply is unsealed or opened and ink can flow through the delivery aperture of the ink delivery device or nozzle.

The invention also consists in a provision of a novel type of inking mechanism utilizing a closed, sealed container of ink, such as a collapsible metal tube, from which the ink is slowly and uniformly expressed for delivery to the printing elements of the printing device with which the inking mechanism is associated. This results in considerable economy, the ink cannot harden, and it is unnecessary to clean an ink receptacle or well. When the ink in the container or tube has been used up, it is merely necessary to remove the empty tube, insert a filled one, and the inking mechanism is then ready for further operation.

The invention also consists in the provision of an inking mechanism provided with means for progressively engaging and compressing the sides of an elongated container or collapsible tube containing ink whereby ink is squeezed from the nozzle of the tube and delivered by suitable dis-

2

tributing elements to the printing dies or type of a printing device with which the inking mechanism is associated.

With these and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations hereinafter fully described and then specifically set forth in the claims hereunto appended.

In the accompanying drawings, which illustrate a preferred embodiment of the invention and form a part of the specification, and in which like characters designate similar parts:

Figure 1 is a front view of an inking mechanism embodying the invention;

Figure 2 is a partial end elevation of the same taken on line 2—2 of Figure 1, illustrating the mounting and driving means of the ink feeding means;

Figure 3 is also a partial end elevation taken on line 3—3 of Figure 1, showing the solenoid operated valve shaft of the ink supply mechanism; and

Figure 4 is a rear view of the inking mechanism of the invention illustrating the reduction gear and driving means for the same.

In the embodiment of the invention selected for purposes of illustration, as shown in Figures 1, 2, 3 and 4, the ink which is to be fed to the printing elements, is contained within an elongated container or collapsible tube T, made of suitable flexible material such as a lead or aluminum foil tube of conventional design. The fact that ink is contained in a tube of this type means that at all times the ink is protected from dust and dirt dispersed in the air; also, it is maintained fresh because of the manner in which it is sealed against access to the air, as described hereinafter.

When the supply of ink in a container has been used up, it is necessary only to remove the used container or tube and insert a filled tube, making the proper adjustments in order to establish the desired working relationship between the several parts, as described hereinafter.

Referring to Figures 1, 2, 3 and 4, the inking mechanism comprising the present invention, is mounted in a suitable housing designated generally 10, which consists of a vertical wall 11 and side flanges 13 around its sides and projecting outwardly therefrom. Housing 10 can be attached in any desired manner to the machine with which the inking mechanism is associated. Although the inking mechanism of the invention is of general application, in the present case it is assumed that it is attached to a cigarette machine and is driven through a beveled gear 12 on shaft 14 (Figure 4) of the main drive of the cigarette machine. Bevel gear 12 meshes with a bevel gear 16 secured to printer drum shaft 18 on which is mounted a suitable conventional printer drum 20 on which travels the paper or web which is to be printed. A portion of printer drum 20 is shown in Figure 1.

Shaft 18, which is mounted in a suitable bearing in wall 11 of housing 10, also has secured

thereto a gear 22 which meshes with and drives gear 24 mounted on shaft 26 which carries type roller 28. Gear 22, by means of intermeshing and intermediate gears 30 and 32, drives gear 34 and shaft 36 which carries ink roller 38 of conventional design (Figure 1). Gear 30 is loosely mounted on stud 40; gear 32 is loosely mounted on shaft 42. Stud 40 and shaft 42 are each supported and held in suitable bearings in wall 11 of housing 10.

The hub of gear 22 is provided with an eccentric 44 which supports and actuates an eccentric strap 45 provided with an eccentric rod 46, the free end of which carries a pin 48 engaging with slot 50 formed in the upper end of arm 52 mounted on shaft 42. Tension spring 54, having its ends connected to arm 52 and eccentric rod 46 respectively, provides means for a proper yielding engagement between these two members. Also mounted on shaft 42 is an arm 56 which at its free end carries an ink transfer roller 58 used to transfer ink from a device provided with an ink delivery orifice or opening, such as a nozzle 60, to ink roller 38 mentioned above. The desired movement or oscillating motion of ink transfer roller 58 is obtained by means of eccentric 44, eccentric rod 46 and arm 52 as described above.

The oscillating motion of arm 56, by means of pawl 62, pivotally mounted thereon, transmits an intermittent rotary motion to ratchet 64 mounted on shaft 66 on which is fixed worm 68 which transfers this intermittent motion to worm wheel 70 on shaft 72. Shaft 72 is supported in a suitable bearing bracket 74 (Figure 4) secured to wall 11 of housing 10. Secured to shaft 72 is a worm 76 which meshes with worm wheel 78 loosely mounted on shaft 80 supported in a suitable bearing in wall 11 of housing 10.

A pawl 82, pivotally mounted on worm wheel 78, engages ratchet 84 mounted on shaft 80, and thereby the intermittent motion of worm wheel 78 is transferred to shaft 80. Pawl 82 is held in engagement with ratchet 84 by means of a suitable spring 86. This spring also provides means for disengaging shaft 80 from its worm drive when it is desired to turn shaft 80 independently. Also mounted on shaft 80 is a bevel gear 88 which meshes with bevel gear 90 slidably keyed to shaft 92 supported by bearing brackets 94, 96 and 98 attached to wall 11 (Figure 1). Bracket 94 is provided with screw stud 100 which engages with an annular groove 102 in hub 104 of gear 90. In effect therefore, bracket 94 supports the hub of gear 104 with shaft 92 extending therethrough, and stud 100 prevents any side movement of bevel gear 90.

Bearing brackets 96 and 98 are secured in any suitable manner to a vertically positioned carriage plate 106 slidably supported by spaced guide rails 108 secured to wall 11 of housing 10 (Figures 1 and 2). As shown in the illustrated embodiment, guide rails 108 are positioned in spaced horizontal arrangement and carriage plate 106 therefore moves in a substantially horizontal direction as the ink in tube T is expressed therefrom and delivered to nozzle 60. If desired, carriage plate 106 could be supported in some other angular position.

Carriage plate 106 is provided with a hub 110 from which extends a horizontal shaft 112, the extreme end of which carries an upright bearing arm 114. Loosely mounted on shaft 102 is a gear 116 freely meshing with an upper gear 118 loosely mounted on a stud 120 projecting

through a slot 121 formed in arm 114 and clamped in fixed adjusted position by means of a shoulder 122 and a thumb screw 124 engaging a conical recess 126 in slot 121 of bearing arm 114. Gears 116 and 118 are so mounted and positioned, as shown in Figures 1 and 2, that they engage and squeeze an ink containing tube and travel therealong from the closed bottom of the tube towards the nozzle portion or open end in progressively expressing all of the ink from the tube or container T. Hub 117 (Figure 2) of lower squeeze gear 116 in the illustrated embodiment forms an integral part with a worm wheel 128 which meshes with a worm 130 secured to shaft 92. The teeth of gears 116, 118, which engage, travel along, compress and express ink from container T, preferably are rounded or free from sharp cutting edges. This arrangement provides a satisfactory and efficient means for expressing ink from tube T, and also the rounded teeth effectively prevent cutting the material from which the tube is formed, which would result in loss of ink.

Nozzle 60, mentioned hereinabove, is secured to an upright tube 132, as by being threadably attached thereto, extending from a duct member 134 provided with suitable passage 136, the opening of which is provided with a tube connecting and securing nipple 138 to which the upper threaded portion or discharge end of a conventional type of collapsible metal or foil ink containing tube T may be attached. Duct member 134 is attached to a pair of stubs 135 held by wall 11 of housing 10.

In order to insure that the least amount of ink can leave nozzle 60 when the machine is stopped, and also that the desired uniformity and freshness of ink can be maintained at all times, there is provided a shut-off valve, designated generally 143, associated with nozzle 60 (Figure 1). In the illustrated embodiment of the invention, the shut-off valve 143 consists of a horizontal shaft 140 provided with a valve hole or bore 142 which is in line with the discharge passage or orifice 61 in nozzle 60. The construction and operation of the shut-off valve 143 is generally the same as that found in conventional shut-off valves of this type, and therefore it may readily be understood that if a shaft 140 is turned a desired number of degrees, say sixty degrees, this axial turning of valve shaft 140 will cause a closing of the passage in nozzle 60, thereby positively cutting off the supply of ink to transfer roller 58.

Referring to Figures 1 and 3, it will be seen that the desired opening and closing of the passage 61 in nozzle 60 by the turning of shaft 140 through sixty degrees, is effected by the action of solenoid 144. Secured to the lower portion of armature 146 of solenoid 144, is a lug 148, the free end of which is provided with a slot 150 which engages with a horizontal rod or pin 152 mounted on one end of arm 154, the other end of which is secured to valve shaft 140. When, therefore, solenoid 144 is energized or de-energized, it causes an upward or downward movement of its armature 146, and valve shaft 140 is turned sufficiently to effect the desired opening or closing of passage 61 in nozzle 60.

In order to prevent sticking and also to assure a quick closing of passage 61 in nozzle 60, pin 152 carries at each end a suitable weight 156. The energization and de-energization of solenoid 144 may be caused by the same switch which starts and stops the motor of the machine. Solenoid 144

is mounted on a suitable bracket 158 attached to wall 11 of housing 10. A slotted bearing lug 141 is provided to give additional support to valve shaft 140 and facilitates removal of duct member 134, its nozzle 60, and valve mechanism.

In preparing the above described inking mechanism for operation, a full tube T of ink is screwed to nipple 130 and the closed end thereof is positioned between gears 116 and 118 which at this time are located at the extreme left, as viewed in Figure 1. Gears 116 and 118 are located at the extreme left as viewed in Figure 1 by gripping nob 160 on shaft 92 and pushing towards the left, which locates carriage plate 106 and gears 116 and 118 in position to receive the ends of the tube. In order to insert the closed end of a full tube T between gears 116 and 118, thumb screw 124 is loosened and gear 118 is raised sufficiently to insert the closed end of tube T between these two gears, after which, gear 118 is lowered and clamped against the closed end of the tube, thumb screw 124 being turned to operative clamping position in conical recess 126 of slot 121, whereby gears 116, 118 will have a firm squeezing grip on the end of the tube.

The inking mechanism is then ready for operation. The slow intermittent turning of shaft 92 causes gears 116, 118 to simultaneously compress and slowly travel along the flattened portion of the tube and express ink from the tube through the passage of duct member 134 into nozzle 60, which, so long as the machine is in operation, is open. That is, valve shaft 140 is turned to the position shown in Figure 1, and ink is free to move through now open nozzle 60 where it is taken up by transfer roller 58 and transferred to ink roller 38. Roller 38 preferably is so constructed and arranged that it has an axial movement as well as a rotary movement, a feature which is well known in the inking mechanism art. Ink roller 38 may in known manner be engaged by a number of spreader rollers (not shown) and another transfer roller 162 which transfers ink from the surface of roller 38 to the type of rotating printer roller 28. The speed reduction between shaft 18 and squeeze gears 116, 118, effected by the eccentric, ratchet, and several sets of worm gears, causes gears 116, 118 to move so slowly along tube T in collapsing it and expressing ink therefrom, that it will take a long time, for example, several months, before the ink supply therein is exhausted.

As an illustration of the operation of the device, when used in a cigarette machine, gears 116, 118 can be so driven that worm 130 makes one revolution every six hours of operation, and gears 116, 118 make one-sixtieth of a revolution in this time, or one complete revolution every 360 hours. This arrangement has the great advantage that the ink supply is always sealed when the machine is stopped or at rest, providing a satisfactory dust proof and dirt-free system, thereby preventing the ink from caking and drying, and also making unnecessary the use of ink fountains and the cleaning thereof.

The invention above described may be varied in construction within the scope of the claims, for the particular device, selected to illustrate the invention, is but one of many possible concrete embodiments of the same. It is not, therefore, to be restricted to the precise details of the structure shown and described.

What is claimed is:

1. An inking mechanism for a printing machine comprising an ink distributing roller, a nozzle, 75

a conduit connected to said nozzle, a pair of meshing gears constructed and arranged to engage opposite sides of a collapsible tube containing a supply of ink, a connection detachably secured to the open end of said tube, positively actuated means for driving said gears to advance said gears along said tube, thereby collapsing said tube and expressing ink therefrom through said conduit and nozzle, an ink transfer roller for transferring ink from said nozzle to said distributing roller, an arm supporting said transfer roller, means on said arm for intermittently driving said means, a valve in said nozzle, operating means for said valve, and means operative in response to the stopping of said printing machine for actuating said valve operating means for closing said valve to prevent the delivery of ink from said nozzle when the movement of said gears is interrupted and said printing machine is stopped.

2. An inking mechanism for a printing machine comprising an ink distributing roller, a nozzle, a conduit connected to said nozzle, a pair of meshing gears constructed and arranged to engage opposite sides of a collapsible tube containing a supply of ink, a connection detachably secured to the open end of said tube, positively actuated means for driving said gears to advance said gears along said tube, thereby collapsing said tube and expressing ink therefrom through said conduit and nozzle, an ink transfer roller for transferring ink from said nozzle to said distributing roller, a valve controlling the delivery of ink from said nozzle to said transfer roller, a valve actuating member, operating means for said actuating member and means operative in response to the stopping of said printing machine for actuating said valve operating means for actuating said member when said movement of said gears is interrupted to prevent the delivery of ink from said nozzle when said machine is stopped.

3. An inking mechanism for use with a printing machine, comprising an ink receiving surface, an oscillatable arm, an ink transfer roller mounted on said arm, a pawl mounted on said arm, a shaft, a ratchet mounted on said shaft and engaged by said pawl, means for oscillating said arm to cause said pawl to engage said ratchet and turn said shaft on one movement of said arm, and to cause said transfer roller to deliver ink to said surface on the return movement of said arm, a worm on said shaft, a second shaft, a worm wheel engaging said worm mounted on said second shaft, a worm on said second shaft, a third shaft, a worm wheel driven by said last-named worm loosely mounted on the third shaft, a ratchet fixed to said third shaft, a pawl on said last-named worm wheel engaging said last-named ratchet, an ink delivery device having an ink passageway, a source of supply of ink to said device, and means driven by said last-named pawl and ratchet for feeding ink from said source of supply through said conduit to said delivery device for transfer by said transfer roller to said ink receiving surface.

4. The inking mechanism defined in claim 3 including means for driving said printing machine, and mechanism for closing said passage-way and interrupting the flow of ink from said ink delivery device when said machine is stopped.

5. An inking mechanism for use with a printing machine, comprising an ink receiving surface, an oscillatable arm, an ink transfer roller mounted on said arm, a pawl mounted on said

arm, a shaft, a ratchet mounted on said shaft and engaged by said pawl; a worm on said shaft, a movable support, a second shaft, a worm wheel engaging said worm mounted on said second shaft, a worm on said second shaft, a third shaft connected to said movable support, a worm wheel driven by said last-named worm mounted on said third shaft, a fourth shaft, driving connections between said third shaft and said fourth shaft, a worm on said fourth shaft, an ink delivery conduit, a source of supply of ink, means connecting said source of ink supply in said conduit, a rotary ink feeding member driven by said fourth shaft, a stud mounting said member, a bracket on said stud, a second rotary ink feeding member mounted on said bracket in operative relationship with said first-named ink feeding member, and continuously operated means for oscillating said arm to move said support and drive said shafts and cause said members to slowly express ink from said source of supply through said conduit onto said ink transfer roller for transfer of said ink to said surface.

6. An inking mechanism for use with a printing machine comprising an ink distributing member, a device provided with a bore and an ink delivery aperture, a source of supply of ink, including a collapsible tube containing a quantity of ink, a conduit connected to said device and said tube, spaced traveling intermeshing tube collapsing members engaging the sides of said tube, a support for said tube collapsing members, driving means for advancing said support to cause said tube collapsing members to move along said tube and squeeze ink therefrom, a valve in said bore of said device, means for maintaining said valve open during normal operation of said mechanism, and mechanism for closing said valve to seal said ink in said bore against delivery therefrom when said inking mechanism is inoperative, said valve closing mechanism including a valve stem, a solenoid connected to said valve stem, and means operated by said solenoid when said machine is stopped to move said valve stem and locate said valve in bore closing position.

7. An inking mechanism comprising an ink distributing member, a device provided with a bore and an ink delivery aperture, a source of supply of ink including a collapsible tube containing a quantity of ink, a conduit connected to said device and said tube, spaced traveling intermeshing tube collapsing members, a movable support for said tube collapsing members, continuously actuated driving mechanism, including a driving shaft, and intermittently actuated driving means driven by said shaft for intermittently moving said support to cause said tube collapsing members to slowly rotate and move along and squeeze said tube to force ink therefrom into said conduit and said bore, said driving means including an elongated shaft and a grip at one end of said shaft for moving said support manually to an inoperative position when substantially all ink has been squeezed from said tube, means for separating said tube collapsing members for reintroduction of the closed end of a filled tube of ink therebetween, and means for securing said members in operative squeezing relationship.

8. In an inking mechanism for a printing machine, an ink conduit, an ink delivery nozzle provided with an ink feeding bore and a delivery aperture, a source of supply of ink comprising a collapsible tubular container, having a

closed end and an open end; means for fixedly securing said open end of said container in said conduit, spaced rotary collapsing and squeezing members supporting said closed end of said container, positively actuated means including a drive shaft for intermittently slowly moving said members along said container towards said fixedly secured end to collapse said container and force ink therefrom into said conduit, a valve in said conduit, and means operative in response to the stopping of the movement of said drive shaft for moving said valve to close said conduit and seal said ink in said conduit from contact with the air and prevent the flow of ink therefrom.

9. In an inking mechanism for a printing machine, an ink distributing roller, an ink transfer roller, a device provided with an ink delivery aperture, a movable support for said ink transfer roller, means for operating said support to move said ink transfer roller to and from said distributing roller and said aperture, a source of supply of ink comprising an elongated collapsible container containing a quantity of ink, said container having an open end and a closed end, a conduit connecting said open end of said container with said device for flow of said ink from said open end of said container through said device for delivery through said aperture, spaced intermeshing members engaging and supporting said closed end of said container, means for rotating said distributing roller, positively actuated intermittently operated driving means operated by said transfer roller support for moving said intermeshing members along said container from said closed end towards said open end thereof to collapse said container and force ink therefrom through said conduit and device, and valve means operative when said distributing roller is stopped for cutting off the flow of ink through said aperture and sealing said ink in said conduit against access of air thereto when said machine is stopped.

10. An inking mechanism for a printing machine comprising an ink distributing roller, a nozzle, a conduit connected to said nozzle, a pair of meshing gears constructed and arranged to engage opposite sides of a collapsible tube containing a supply of ink, a connection detachably secured to the open end of said tube, means for driving said gears to advance said gears along said tube, thereby collapsing said tube and expressing ink therefrom through said conduit and nozzle, an ink transfer roller for transferring ink from said nozzle to said distributing roller, a valve controlling the delivery of ink from said nozzle to said transfer roller, a valve actuating member, and means for actuating said member when said movement of said gears is interrupted to prevent the delivery of ink from said nozzle when said machine is stopped, said last named means including a solenoid, a driving shaft, and means operative in response to the de-energizing of said solenoid and the stopping of movement of said shaft to move said valve to closed position.

HENRY L. BECHTOLD.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,841,275	Baptiste	Jan. 12, 1932
1,842,000	Winsor	Jan. 19, 1932
1,849,143	Granger	Mar. 15, 1932
2,065,279	Kline	Dec. 22, 1936