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[54] OSCILLATABLE INK PAD AND PRINT MEMBER

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[52] **U.S. Cl.** **101/333,** 101/103, 118/263, 118/264, 101/301

[51] **Int. Cl.** **B41k 1/42**

[58] **Field of Search**.....101/103, 104, 105, 106, 107, 101/333, 334, 327, 301, 310; 118/264, 263, 265

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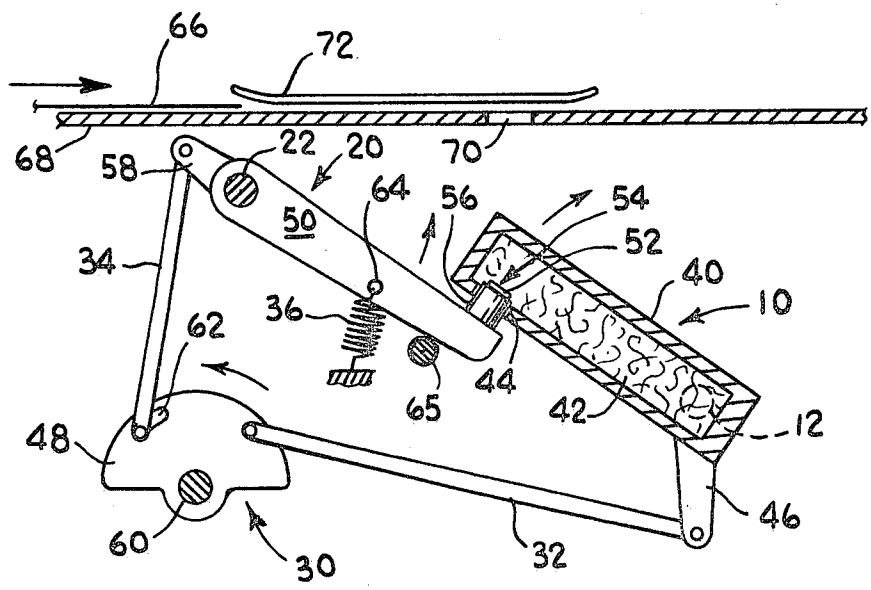
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[57] **ABSTRACT**

A printing apparatus for use in printing with inks having a relatively highly volatile vehicle onto selected areas of a record sheet includes an ink storing means mounted for movement between a normal position and a remote position and comprises a porous absorbent material substantially enclosed in a body portion having a limited access opening disposed therein for admitting a printing means in ink contacting engagements.

The printing means is mounted for movement between a normal position and a printing position. An actuating means is operatively associated with the ink storing means and the printing means for producing a coordinated cyclical movement of the printing means and the ink storing means from their normal positions to the respective printing position and the remote position non-interferingly through interfering paths such that the ink storing means moves out of the path of the printing means before the printing means moves from the normal position to the printing position and the printing means returns to the normal position before the ink storing means returns to its normal position.

3 Claims, 2 Drawing Figures



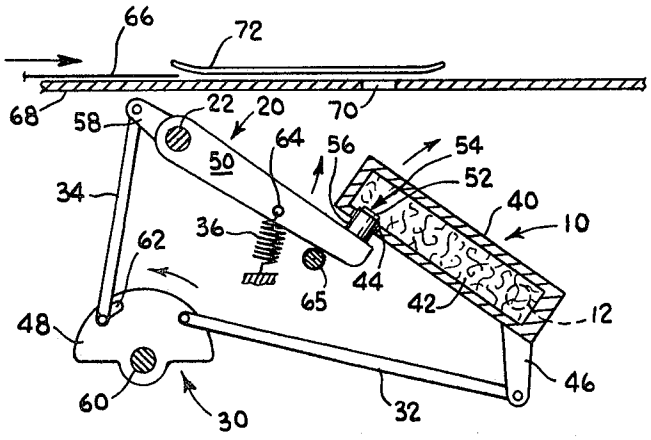


FIG. 1

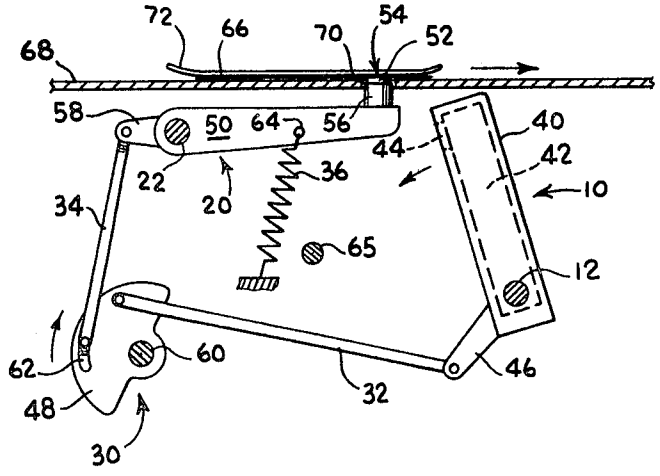


FIG. 2

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OSCILLATABLE INK PAD AND PRINT MEMBER

BACKGROUND OF THE INVENTION

This invention relates in general to a printing apparatus and in particular to apparatus for containing ink of a highly volatile nature which is applied to an applicator for printing indicia onto a desired surface.

Conventional inking devices using pigmented inks have at least a portion of their ink supply exposed to the atmosphere. These devices are of two types. One type includes a reservoir of ink which is connected to an applicator roller by a wick which through capillary action provides a continuous quantity of ink to the applicator roller. The second type of inking device is one in which an absorbent member such as felt is pre-saturated with a quantity of ink and which, through contact with an applicator roller, provides a continuous amount of ink to the applicator.

When an attempt is made to use either of these type devices with an ink using a relatively highly volatile vehicle as methyl-ethyl-ketone (MEK), the ink evaporates extremely rapidly leaving a solid residue on the absorbent or wicking member wherever it is exposed to the atmosphere. This residue quickly clogs the pores of the member so that it is no longer capable of substantially absorbing additional ink and the printing operation must be stopped to replace the absorbent members or to add additional amounts of the vehicle to the ink or to soak the absorbent members in a container of the volatile vehicle until the residue is flushed out of the absorbent members.

BRIEF SUMMARY OF THE INVENTION

The present invention obviates the foregoing disadvantages of prior art printing systems by providing a relatively simple yet reliable mechanical device for preventing rapid evaporation of the volatile vehicle in the ink supply.

In accordance therewith, the present invention provides for a printing apparatus for depositing a marking material dissolved in a highly volatile vehicle on selected areas of a record sheet, which comprises means for storing ink which substantially prevent evaporation of the ink vehicle and has a limited access opening therein, the ink storing means being mounted for movement between a normal and a remote position. The present invention also provides for a means for printing indicia mounted for movement between a normal position in which the printing means contacts the ink storing means through the access opening and a printing position in which the printing means is disposed away from and out of contact with the ink storing means and actuating means operatively associated with the ink storing means and the printing means for producing a coordinated cyclical movement of the ink storing means and the printing means from the normal positions to the respective remote position and printing position the actuating means including means for moving both the ink storing means and the printing means non-interferingly through interfering paths such that the ink storing means moves out of the path of the printing means before the printing means moves from the normal to the printing position, and printing means returns to the normal position before the ink storing means returns to its normal position.

It is thus an object of the present invention to provide a means for printing a desired indicia onto selected surfaces with a fluorescent marking material suspended in a highly volatile vehicle.

It is a further object of the present invention to provide a means for maintaining the absorptive quality of the applicator when printing with fluorescent or other marking materials suspended or dispersed in a vehicle with a high vapor pressure.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing there is generally shown an ink storing means **10** which is mounted for movement between a normal and a remote position as illustrated in FIGS. **1** and **2**, respectively on a first pivot **12**. A printing means is generally shown at **20** and is mounted for movement about a second pivot **22** between a normal position in which the printing means **20** contacts the ink storing means **10** as shown in FIG. **1** and a printing position shown in FIG. **2**, in which the printing means **20** is disposed away from and out of contact with the ink storing means **10**. An actuating means **30** is operatively associated with the ink storing means **10** and the printing means **20** and includes a first and second linkage **32** and **34**, respectively, and a compression spring **36** for producing a coordinated cyclical movement of the ink storing means **10** and the printing means **20** from the normal positions to the respective remote position and the printing position and to return to the normal positions.

More specifically, the ink storing means **10** comprises a substantially enclosed body portion **40** having a porous absorbent material **42** disposed within its body for storage of a highly volatile ink. An orifice **44** is formed in the body portion **40** to provide a limited access opening for dispensing ink to the printing means **20** as will be described below. An integral extension **46** to the body portion **40** extends from the body portion **40** at an angle to the longitudinal of the body portion **40**. The free end of the extension **46** is rotatably connected to one end of the first linkage **32** so that the ink storing means **10** can be rotated about the first pivot **12** between the normal position and the remote position in response to the first linkage **32** transmitting motion from its other end which is rotatably connected to a crank **48**.

The printing means **20** in more detail comprises an arm **50** having a printing tip **52** fabricated from compressed fiber such as felt or a spongelike absorbent material such as spong rubber having its face **54** embossed or formed to the configuration of a desired indicia to be printed onto selected areas of a record sheet **66**. The printing tip **52** extends from a cup **56**, the latter being fastened by conventional means to the arm **50** and is conventionally held in the cup **56** with the face **54** away from the cup **56**. The printing means **20** additionally comprises an integral extension **58** to the arm **50** at the connection to the second pivot **22**. The extension **58** is rotatably connected at its free end to the second linkage **34** so that the printing means **20** is rotated about the second pivot **22** by the second linkage **34** transmitting motion thereto from its other end which forms a lost motion connection with the crank **48**.

Power is transmitted from the actuating means **30**, by the crank **48** which is reciprocally moved by a shaft **60** connected to a conventional reciprocal drive. The crank **48** as described above is rotatably connected to one end of the first linkage **32**. The crank **48** is provided with an arcuate slot **62** for the lost motion connection to the end of the second linkage **34**. One end of the spring **35** is connected to the arm **50** through an aperture **64** and the other end is conventionally connected to a frame or other non-movable connection (not shown). A stop **65** is conventionally provided on a frame or other means for the arm **50** to resist the residual compression force of the compression spring **50** when the arm **50** is in a normal position as shown in FIG. **1**.

During a printing operation, a record sheet **66** is driven into position by conventional means along a track **68** having a cutout **70** which provides access for the printing tip **52** therethrough to the record sheet **66**. A backing plate **72** is positioned behind the record sheet **66** when it is over the cutout **70** to insure that the printing tip **52** makes a firm printing contact with the record sheet **66**. After each record sheet **66** is imprinted with a selected indicia embossed on the printing tip **52**, it is moved to the right of the FIGS. by well known means and a new record sheet **66** is moved from the left over cutout **70** for a similar imprinting.

Wetting of the printing tip **52** is accomplished as the arm **50** rests againsts the stop **65** in the normal position shown in FIG. **1**. The body portion **40** is positioned with the orifice **44** around the cup **56** in a sealing configuration and the printing tip **52** cooperatively making contact with the absorbent material **42** in the body portion **40**. The arm **50** is secured in the normal position by the force of the actuating means **30**.

For a printing operation,the ink storing means **10** is rotated about the first pivot **12** in a clockwise direction from its normal position while the lost motion connection for the second linkage **34** remains stationary sliding in the slot **62** as the crank **48** rotates counterclockwise, in order to provide clearance for the printing means **20** which is driven in a counterclockwise direction when the right corner of the slot **62** as shown in FIG. **1**, contacts the second linkage **34** connection. The crank **48** is rotated counterclockwise by the drive shaft **60** and the lost motion connection in the slot **62** allows the printing means **20** to remain in the normal position until sufficient clearance is provided to move non-interferingly through its path after the ink storing means **10** is moved through its portion of the path which interfers with the path of the printing means **20**. Thus the lost motion connection allows both the ink storing means **10** and the printing means **20** to move non-interferingly through interfering paths. As the crank **48** continues rotating counterclockwise, the right corner of the arcuate slot **22** engages the connection to the second linkage **34**, thereby rotating the printing means **20** against the force of the compression spring **26** about the second pivot **22** thereby bringing the printing tip **52** into printing contact with the record sheet **66**. The backing plate **72** supports the record sheet **66** which is momentarily stopped in place in a printing position to make a distinct impression as the printing operation is performed. (See FIG. **2**.)

The velocity of rotation of the crank **48** is at least partially absorbed in the imprinting step preventing excess wear on the actuating means from rapid decelerating and the rotation of the crank **48** is then reversed to rotate in a clockwise direction.

Clockwise rotation of the crank **48** returns the ink storing means **10** in a counterclockwise direction to the normal position and the printing means **20** in a clockwise direction to the normal position about the first and second pivots **12** and **22**, respectively. The printing means **20** is returned to the normal position in advance of the ink storing means **10** since the compression spring **36** maintains the second linkage **34** connection in the upper side of the arcuate slot **62** as viewed in FIG. **2**. The printing means **20** is rotated below the ink storing means **10** and halted against the stop **65** as viewed in FIG. **1**. The orifice **44** then fits over the cup **56** until a sealing configuration is formed thereby as the second linkage **34** connection in the arcuate slot **62** slides to the left side (FIG. **1**) of the arcuate slot **62** and comes to rest in the normal position as shown in FIG. **1**.

The operating cycle is repeated as each succeeding record sheet **66** is moved into position for imprinting. It should be clear that a greater percentage of the cycle is expending in moving the next record sheet **66** into position and removing the record sheet **66** already imprinted out of position than in the actual printing portion of the cycle wherein the printing tip **52** is exposed to the atmosphere. The ink storing means **10** therefore inhibits the evaporation of the relatively volatile vehicle for the ink while the wettable printing tip **52** is positioned to absorb fluorescent marking material in a relatively volatile vehicle from the porous absorbent material **42** during contacting engagement therewith. Thus the printing tip **52** is maintained soft and wettable for good liquid transfer and the ink storing means **10** does not lose the relatively volatile vehicle so rapidly that constant refilling is necessitated.

It is thus apparent from the foregoing that there has been provided a printing system for printing record sheets with a fluorescent marking material carried in a volatile vehicle which achieves the foregoing objects and advantages of the present invention. It is to be understood, however, that the invention is not limited to the specific embodiment described above and shown in the accompanying drawings, which embodiment is merely illustrative of the best mode presently preferred for carrying out the invention and is susceptible to change in form, size, detail and arrangement of parts. For example, the crank, linkages, and compression spring driving arrangement would be replaced with a camming arrangement and the printing tip could be moved in a vertical motion while the ink storing means is moved in a right angle motion to uncap the printing tip and move out of the way. Thus it is seen that the invention is intended to cover all such variations, modifications and equivalents thereof as may be deemed to be within the scope of the claims depended hereto.

I claim:

1. In a printing apparatus having a frame and a means for supporting a print receiving sheet at a work station: the improvement comprising

a substantially closed printing fluid reservoir means;

means mounting said reservoir means for pivotal movement about a first axis;

a print arm having a printing tip;

means mounting said print arm for pivotal movement about a second axis;

stop means for determining the normal positions of said reservoir means and said print arm, said positions being such that the printing tip of said arm then extends through an aperture formed in said reservoir means; and

drive actuating means for sequentially pivotally actuating said print arm and said reservoir means; said drive means including a linkage for initiating one of said pivotal movements before initiating the other of said pivotal movements.

2. Apparatus as defined by claim 1 wherein said drive actuating means includes a common driven shaft and a plurality of crank means which when operated serve to pivotally actuate said reservoir means before initiating the pivotal actuation of said print arm.

3. Apparatus as defined by claim 1 wherein said print arm is spring biased to its normal position.

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