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Gery et al.

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[54] **PRINTING MECHANISM FOR PRINTING ON FLAT OR CONTOURED SURFACES**

[75] Inventors: **Herbert C. Gery**, Villas; **Marvin S. Samson**, Lindenwold, both of N.J.

[73] Assignee: **Medical Electroscience and Pharmaceuticals, Inc.**, Cherry Hill, N.J.

[22] Filed: **Sept. 27, 1971**

[21] Appl. No.: **183,944**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 861,712, Sept. 29, 1969, Pat. No. 3,635,154.

[52] **U.S. Cl.** **101/327**, 101/41, 101/305

[51] **Int. Cl.** **B41f 17/14**

[58] **Field of Search**.....101/41–44, 305, 101/309, 314, 327

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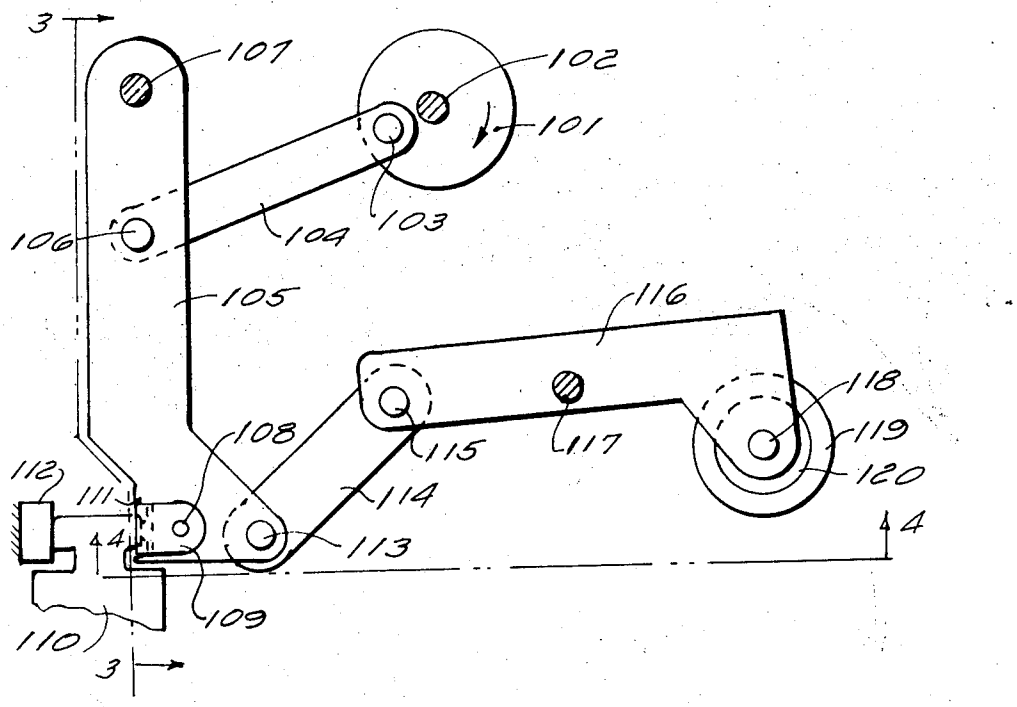
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Primary Examiner—Robert E. Pulfrey
Assistant Examiner—Clifford D. Crowder
Attorney—Robert K. Youtie

[57] **ABSTRACT**

A printing mechanism wherein a pivoted arm carries a printing head facing tangentially of the arm for swinging movement into and out of printing engagement with articles to be printed, a pivoted lever carries inking means swingable with the lever into and out of inking engagement with the printing head when the latter is retracted from its printing position, operating means interconnect the lever and arm to effect simultaneous swinging movement thereof, and drive means power the arm and lever movement.

6 Claims, 4 Drawing Figures



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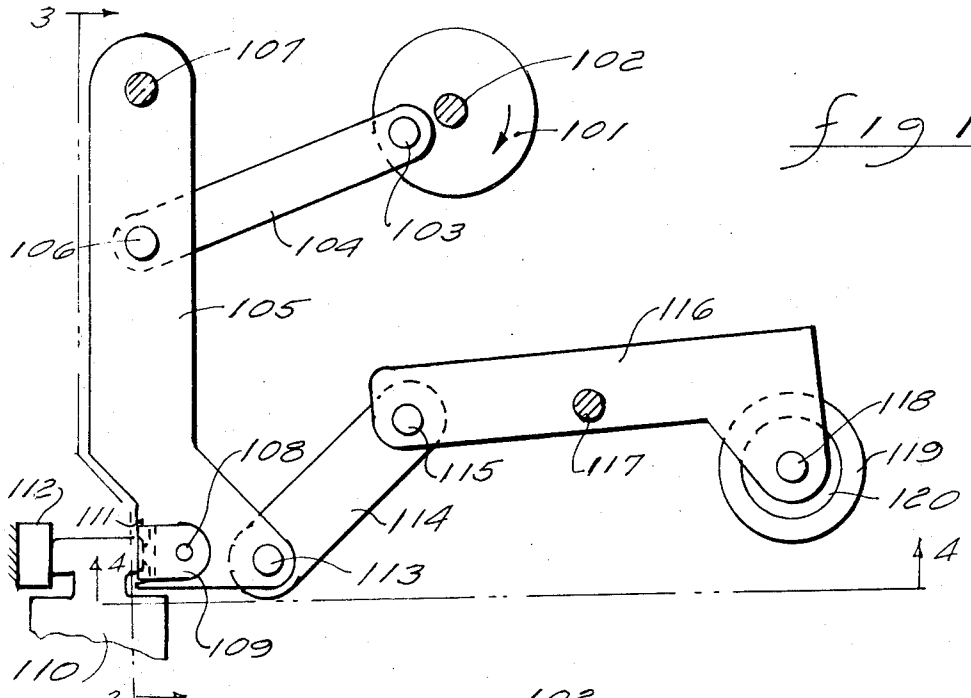


fig 1

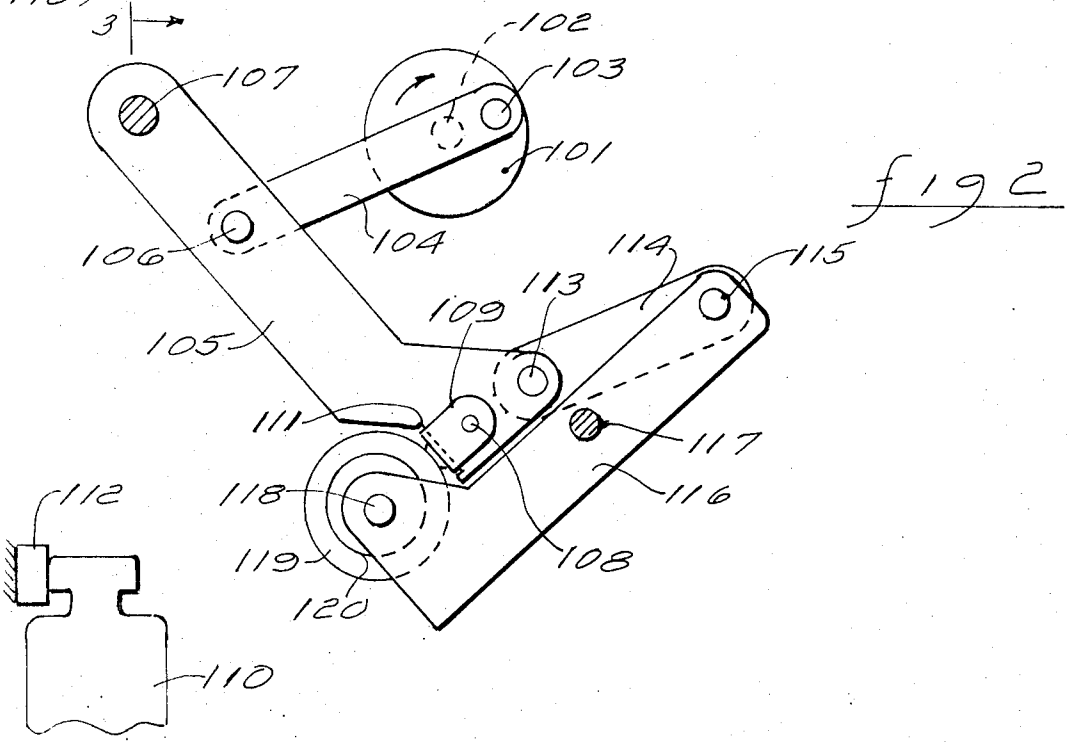


fig 2

INVENTOR.
HERBERT C. GERY
BY MARVIN S SAMSON
Robert K. Youtie

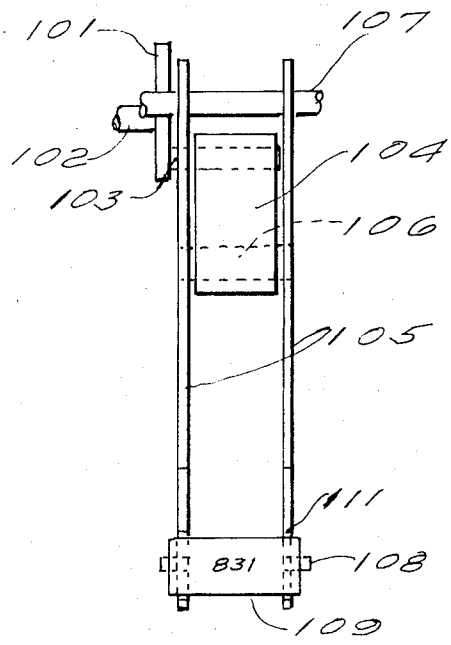


fig 3

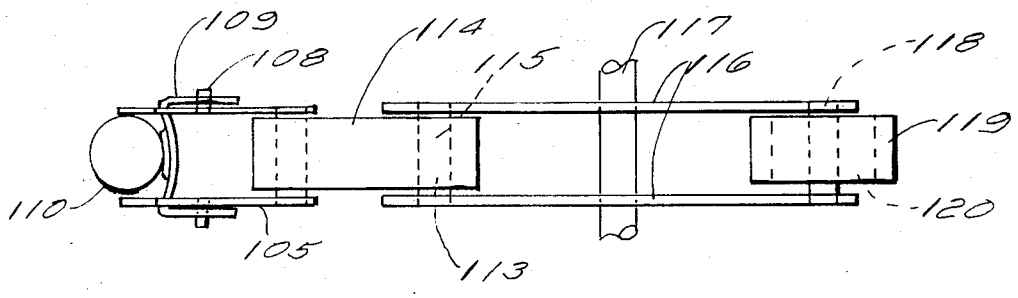


fig 4

INVENTOR.
HERBERT C. GERY
BY MARVIN S. SAMSON
Robert K. Gauthier

PRINTING MECHANISM FOR PRINTING ON FLAT OR CONTOURED SURFACES

CROSS-REFERENCES TO RELATED APPLICATIONS

This application is a Continuation-in-Part of our copending prior application Ser. No. 861,712, filed Sept. 29, 1969 and entitled APPARATUS FOR PRINTING ON CONVEX SURFACES now U.S. Pat. No. 3,635,154.

BACKGROUND OF THE INVENTION

While the printing mechanism of the present invention is intended primarily for printing on convex surfaces, as in said copending patent application, and will be illustrated and described hereinafter with particular reference thereto, the apparatus of the present invention is equally well suited for printing on a wide variety of other surfaces, including flat, concave, or of other contours.

In the manufacture and distribution of pharmaceuticals, it is often necessary or desirable to package such product so that certain information and indicia remain with the package throughout its life, such as the contents, batch and lot numbers, and other information. Often such packages are relatively small, so that proper registry of the printing mechanism is difficult to obtain, especially after slight wear of the printing device.

SUMMARY OF THE INVENTION

It is, therefore, one important object of the present invention to provide a printing mechanism of the type described wherein precision and accuracy of printing is continuously achieved throughout a long useful life of the mechanism, so that even printing on small packages, or other high precision printing requirements are consistently performed.

It is still another object of the present invention to provide a printing mechanism wherein high rates of production and efficient operation are consistently achieved in precisely timed relation with respect to container filling, closing and sealing operations for highly efficient and substantially completely automatic packaging operations.

It is a more particular object of the present invention to provide a unique printing mechanism wherein the printing head is mounted for movement into and out of printing relation by an extremely simple mounting mechanism so as to involve a minimum of possible wear and resultant play and lack of register.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view showing a printing mechanism of the present invention in a printing position.

FIG. 2 is a side elevational view showing the printing mechanism of FIG. 1 but in a retracted, inking position.

FIG. 3 is a sectional elevational view taken generally along the line 3—3 of FIG. 1.

FIG. 4 is a generally horizontal sectional view taken approximately along the line 4—4 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings, and specifically to FIGS. 1, 3 and 4 thereof, a rotary drive, eccentric or crank **101** is carried by a rotary shaft **102**, which shaft may be the output from a single cycle motor, single cycle clutch, or the like. Such motors and clutches are well known, so that further showing is not necessary.

The crank or rotary drive **101** is provided with an offset or eccentric pin or stub shaft **103** which orbits about the axis of shaft **102**. A connecting rod or link **104** has one end pivotally connected to stub shaft or pin **103**. The other end of connecting rod or link **104** is pivotally connected, as by a pivot or pin **106** to an intermediate portion of print carrier or arm **105**.

More specifically, the print carrier or arm **105** may be of a double or laterally spaced, two-part arm construction, best seen in FIG. 3, having one end, its upper end in the illustrated embodiment, pivotally mounted as by a fixed pivot **107**. Thus, the arm **105** has its upper end mounted by the pivot **107**, depending therefrom, and is swingable in a rotary path about the axis of pin **107**. It will therefore be understood that the crank **101** and connecting rod **104** serve to define drive means for effecting oscillatory motion of the arm **105** back and forth along a rotary path. It will also be appreciated that the permanent or fixed pin **107** is the only pivot for the arm **105**, so that the accuracy or degree of precision of arm movement depends upon the accuracy or precision of the pivotal support **107**.

The lower end of the arm **105** is provided with two aligned pins **108**, each fixed to a respective arm section or part, and being connected to opposite ends of a yieldable printing face **109**. Thus, the lower end of arm **105**, together with print face **109** and connector pins **108** all combine to define a printing head swingable with the lower end of the arm. That is, the printing head **108, 109** swings or oscillates along a rotary path having its center of curvature coaxial with pin **107**, and the print head faces tangentially of the path, to the leftward as seen in FIG. 1. As best seen in FIGS. 3 and 4, the resiliently yieldable printing face or head **109** spans or bridges the space between the laterally spaced components or parts of arm **105** for printing engagement with a container **110** or other article to be printed. Further, the sections or parts of arm **105** each is formed with a groove **111**, see FIGS. 1 and 2, which receives and locates the print face **109** and also prevents the print face from rotating out of correct printing position. Printing of the container or other article **110** occurs when the surface to be printed is positioned in front of a printing anvil **112** secured to the frame of the apparatus. If the size of the container **110** varies, the anvil **112** can be made adjustable to accommodate the size of the container and still have the printing position of the arm **105** vertical, as shown in FIG. 1.

Located behind the print face **109**, to the right in FIG. 1, is a pivot pin **113** to which is pivotally connected one end of an operating member or link **114**. The other end of the member or link **114** is pivotally

connected by a pin 115 to a lever or arm 116. That is, the lever or arm 116 is mounted intermediate its ends by a fixed pivot means or pin 117, the lever or arm 116 extending from the pivot 117 to and having its extending end pivotally connected by the pin 115 to the link 114.

The outer or rightward end of lever or arm 116, as seen in FIG. 1, is provided with a pivot or pin 118 which carries an inking member or saturable ink roller 119. The ink roller 119 is constructed to rotate in one direction only, as by mounting on a single direction overriding clutch 120. As a result, when the mechanism is in the printing position of FIG. 1, the print arm 105 is substantially vertical and the inking roller 119 of the lever 116 is moved out of the way and into a remote, non-interfering position with respect to the printing operation. Viewed otherwise, the inking member or roller 119 is located remote from and behind the printing face or head 109 when the latter is in its extended or printing position.

The position shown in FIG. 2 illustrates the drive mechanism or crank 101 having been rotated approximately 180° from the position of FIG. 1, so as to fully retract the arm 105 out of and away from its printing position. When the print head carrier or arm 105 is moved into this extreme retracted position of FIG. 2, counterclockwise as seen therein, the zone of printing on the container 110 has been opened and the container previously printed is therefore free to move out of the printing station or location, and the next container is free to move into the printing station.

As the print head carrier 105 is rotated counterclockwise, the operating member or link 114 is driven by the pin 113 and moves toward its rightmost position. The pin 115, which secures the link 114 to the extension of lever 116, is located such that this counterclockwise movement of arm 105 moves the leftmost extension of lever 116 in FIG. 1 in an upward direction causing the arm 116 to rotate clockwise about shaft 117. The clockwise angular movement of lever 116 is sufficient so that inking roller 119 will pass over and in inking engagement with the print face or head 109. That is, the inking member or roller 119 swings with its lever 116 to a position in front of and in rolling inking engagement with the print head to ink the latter for the next printing. As best seen in FIG. 2, the arm 105, the link 114 and the lever 116 are positioned in the inking relation such that the adjoining faces of the various elements are almost touching when the ink roller 119 has traversed the print face 109 the distance required to substantially completely ink the type faces of the printing head. As best seen in FIG. 4, the lever 116 is also of a double construction, including a pair of substantially identical parallel members, between which are pivotally mounted the link 114 and roller pivot pin 118.

Upon continued clockwise rotation of the drive crank 101, the arm 105 returns clockwise toward its printing position of FIG. 1, and the lever 116 returns counterclockwise toward its remote position of FIG. 1.

From the foregoing, it is seen that a printing mechanism is provided which is admirably well suited for printing on cylindrical and other similar containers, and in which the location of the printing on the article to be printed is extremely accurate, a fresh supply of ink being applied to the printing face before each printing, and which otherwise fully accomplishes its intended objects.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention.

What is claimed:

1. A printing mechanism comprising an arm, arm pivot means swingably mounting said arm at one end thereof, a printing head carried by said arm spaced from said one arm end and facing generally tangentially of arm movement for swinging motion between a retracted nonprinting position and an extended printing position, the degree of precision of said printing head and said printing position being dependent upon the accuracy of said arm pivot means, drive means for effecting said swinging arm movement, a lever, lever pivot means swingably mounting said lever, an inking member carried by said lever for swinging movement therewith into and out of inking relation with said printing head when the latter is in said retracted position, and operating means interconnected between said arm and lever for swinging the latter simultaneously with said arm into and out of inking relation with said printing head when the latter moves into and out of said retracted position, said operating means comprising linkage means interconnecting said lever and arm, said lever including an extension extending from said lever pivot means in the direction away from said inking member, and said linkage comprising a link having its opposite ends pivotally connected to said extension and arm at the end of the latter opposite said one end.

2. A printing mechanism according to claim 1, said printing head comprising a printing face resiliently yieldable upon printing engagement in said printing position.

3. A printing mechanism according to claim 1, said drive means comprising a rotor, and connecting means between said rotor and arm.

4. A printing mechanism according to claim 1, said inking member being rotatable relative to said lever for rolling engagement in said inking relation.

5. A printing mechanism according to claim 1, said drive means including a connecting rod connected to said arm for oscillating the latter in a rotary path between said retraced and extended positions.

6. A printing mechanism according to claim 3, said link and extension being configured to oscillate said lever in a rotary path between a noninking position remote from and in back of said printing head and an inking position proximate to and in front of said printing head.

* * * * *