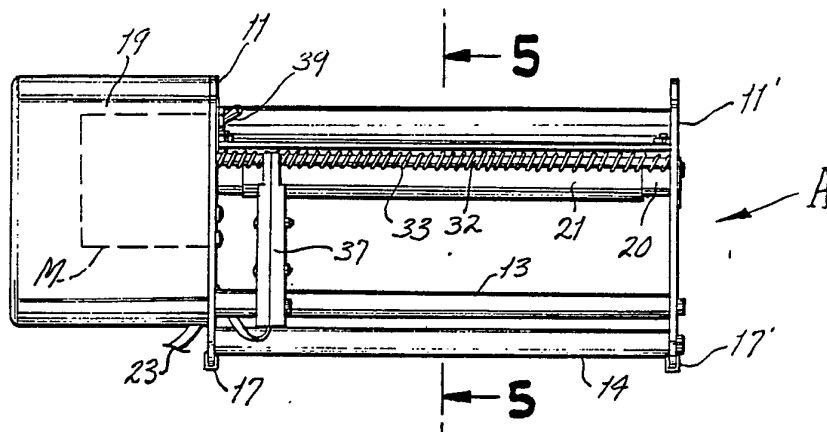




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/US88/02103</p> <p>(22) International Filing Date: 24 June 1988 (24.06.88)</p> <p>(71)(72) Applicants and Inventors: OGLANDER, Alan, H. [US/US]; 9 Sackston Woods, St. Louis, MO 63141 (US). SHANNON, Richard, E. [US/US]; HCR Box 1288, Rocky Mount, MO 65072 (US).</p> <p>(74) Agents: KALISH, Ralph, W. et al.; Kalish & Gilster, 818 Olive Street, Suite 1614, St. Louis, MO 63101 (US).</p> <p>(81) Designated States: AT (European patent), AU, BE (European patent), CH (European patent), DE (European patent), FR (European patent), GB (European patent), IT (European patent), JP, NL (European patent), SE (European patent), US.</p>		<p>Published With international search report.</p>

(54) Title: LABEL DISPENSING MACHINE



(57) Abstract

A label dispensing machine (A) for use with a backing sheet carrying adhesive labels to be dispensed automatically by the machine by peeling the labels from the backing sheet. The machine has a frame (11, 11', 12, 13, 14) carrying a support plate (26) for receiving the backing sheet. An element (27) retains the label-carrying backing sheet against the sheet-receiving surface. The support plate has a leading edge (28). A drive roller (20) and idler roller (21) is positioned relative to the leading edge for receiving and grippingly engaging the backing sheet in an orientation extending in bended configuration over the leading edge. A motor (M) rotatably drives the drive roller in a direction for pulling the backing sheet from the sheet-receiving surface over the leading edge to peel labels from the backing sheet. A microswitch (37) has an actuator (37') responsive to the peeled labels for controlling the motor for sheet-pulling operation by the drive roller until said at least one of the peeled labels is presented at the leading edge for removal. A label guide member (32) which guides the labels forwardly for presentation as they are peeled from the backing sheet at the leading edge rotatably carries a reduced area contact (33) for reliably retaining the presented labels in a lightly adhered condition for easy removal and transfer for further use.

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LABEL DISPENSING MACHINEBACKGROUND OF THE INVENTION

The invention relates in general to label dispensing and, more particularly, to a motor-driven machine for
5 facilitating the removal of adhesive-coated labels from a backing sheet.

Heretofore, in the field of label dispensing, wherein labels are to be withdrawn from a backing sheet, machines have been developed which are motor driven and which
10 provide control switches operable by contact with the parting label for effecting interruption of operation of the related motor and with resumption of operation upon withdrawal of the freed label. Exemplary of devices of this character are U.S. Patent Nos. 3,941,278 and
15 3,991,906 of the present inventors, Alan H. Oglander and Richard E. Shannon. A manual label dispensing machine of the same inventors is disclosed in U.S. Patent 4,194,646.

A problem in the operation of motor-driven label dispensing machines is to assure that labels peeled from
20 the backing sheet will be presented in an orientation in which they may be easily and readily grasped by the user to be applied to mailing pieces under all conditions of usage, and yet will not be caused to adhere too tightly or otherwise present a problem in being lifted from the
25 apparatus for usage. It is desired that the labels so presented be prevented from being entrapped in rotating or moving portions of the machine, such as rollers, so which would prevent them from being used, it being important that each label must under all circumstances be preserved
30 for, otherwise, it would be necessary to hand address a label, or obtain a specially printed label, which would be expensive and time-consuming and thus to be avoided under all circumstances.

Prior label dispensing machines could not be used
35 effectively for single page backing sheets.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a label dispensing machine which reliably dispenses peeled labels for presentation to the user and which assures that such labels will be maintained in a proper orientation for being seized and transferred to a mailing piece; which prevents the labels from falling from the machine; which avoids the prospect of the labels becoming entrapped in the machine or otherwise affixed to a roller or destroyed or damaged during operation; and which does not interfere with the ready removal of peeled labels by the user; and which operates with a very high degree of reliability and repeatability throughout the design lifetime of the machine.

It is also an object of the present invention to provide such a machine which is very readily and easily constructed, which is simply and effectively cleaned; and which does not require adjustment or modification during its lifetime.

Among still other objects of the present invention may be noted the provision of a machine of the character stated which can be easily and quickly loaded with a source of labels; which operates reliably without regard to the size of the various labels, permitting a wide range of label needs to be accommodated by the same machine; which operates automatically without action on the part of the user as labels are removed from the machine; which can be used quickly and easily by unskilled persons without requirement of the services of his skilled or experienced operator; and which in operation is especially designed to be useful for continuous discrete, single page backing sheets with limited selvedge so as to avoid loss of labels with such single sheets.

Briefly, a label dispensing machine embodying the present invention is intended for use with a backing sheet carrying adhesive labels to be dispensed automatically by the machine by peeling of the labels from the backing sheet. The machine includes a frame, and a surface-forming member carried by the frame having a surface for receiving the backing sheet carrying such labels. Associated with the surface-forming member is a guide for retaining the label-carrying backing sheet against said surface.

The surface-forming member has a discharge edge, and certain rollers are positioned relative to the discharge edge for receiving and grippingly engaging the backing sheet in an orientation extending in bended configuration over the discharge edge. A drive motor rotatably drives the rollers in a direction for pulling the backing sheet from the sheet-receiving surface, over the leading edge, and into the rollers, causing the labels to be peeled from the backing sheet as the backing sheet passes over the discharge edge. Switch means is positioned for being actuated by the presence adjacent the leading edge of at least one of the labels so peeled from the backing sheet, in order to control the motor for sheet-pulling operation of the rollers until said at least one of the peeled labels is presented at the leading edge for removal. A guide means guides the labels forwardly for presentation as they are peeled from the backing sheet at the leading edge, and reduced area contact means is carried by the guide means for reliably retaining the presented labels in a lightly adhered condition for easy removal and transfer for further use.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a label dispensing machine constructed in accordance with embodying the present invention, as it appears prior to receiving a label supply source.

FIG. 2 is an end elevation view thereof.

FIG. 3 is an opposite end elevation view thereof.

FIG. 4 is a bottom plan view of the label dispensing machine of FIG. 1.

FIG. 5 is a vertical cross section taken generally along line 5--5 of FIG. 1.

FIG. 6 is an enlarged fragmentary top plan view of the machine of FIG. 1, illustrating in phantom the location of a label-bearing backing sheet and depicting the orientation of labels during operation of the machine.

FIGS. 7A - 7C together represent a series of enlarged fragmentary cross-sections showing a sequence of steps in loading and operation of the machine of FIG 1.

FIG. 8 is a schematic circuit diagram of a motor circuit for controlling operation of the machine.

Description Of The Preferred Embodiments

Referring now by reference numerals to the drawings which illustrate the preferred embodiment of the present invention, A designates a label dispensing machine having a frame comprised of opposed, parallel, spaced-apart side plates 11, 11' which are of general rectangular shape and spacedly maintained apart by three rods 12, 13 and 14 which are secured as by screws 15 threaded into their ends. Both of side plates 11, 11' and said rods may be of stainless steel. Extending along the lower edges of plates 11, 11' are runners 17, 17' of skid-resistant resilient material to provide non-marring support of label machine A on a surface.

Affixed externally of side plate 11 is a housing 19 in which is located a conventional drive motor M and its associated gearing for causing rotation of a shaft 20 carrying a rubber roller 21 for purposes presently appearing, said shaft being journalled and supported, as at its outer end by a bearing 22 for rotation in response to operation of the motor in a manner described hereinbelow. Neither the physical aspects of motor M nor those of its related gearing and electrical connections for such operation are specifically illustrated, but motor M will be seen to be represented in phantom in FIG. 1, and such mechanical features are conventional and will be readily understood by those skilled in the art. Conventional AC power for motor M is supplied from an AC source S by leads 23 to a circuit shown in FIG. 8.

Drive motor M rotates a drive roller shaft 20 clockwise in the orientation depicted in FIG. 5 and includes a rubber jacket 21 for frictionally accelerating the backing sheet to which are affixed adhesive labels, pulling said sheet forward along a support plate 26 which

extends between the side plates. The backing sheet with labels affixed is retained along support plate 26 by a bracket-like retainer 27, spaced upwardly of support plate 26 a predetermined distance and suitably secured lengthwise immediately behind a leading, discharge edge 28 of the support plate. Retainer 27 thus cooperates with support plate 26 to define an appropriate discharge aperture 29, providing containment of labels and backing sheet. The backing sheet is also restrained and directed toward retainer 27 by parallel and opposite guide brackets 30 and 30', suitably fastened to support plate 26.

Support plate 26 is swingably affixed to rod 12 by at least one hinge bracket 31 centrally affixed to the support plate proximate the rearward edge thereof. By means of a handle-forming lip 27' of the retainer, the entire support plate can be swung upwardly and rearwardly for sheet loading and for access to jacketed drive roller 21.

Rigidly attached to plates 11 and 11', immediately forward of and axially parallel to leading edge 28, is a rod-configuration discharge guide member 32. This member is positioned such as to direct adhesive labels outward to facilitate subsequent use while directing backing sheet downward, as toward suitable point of collection. Rotatably carried by discharge guide member 32 is a reduced surface area roller contact 33. Contact 33 designed such as to eliminate adhesion of labels to discharge guide member 32 and to facilitate removal of labels while said labels retain their adhesive qualities. Most preferably, contact 33 is of coil spring character, being formed of a single length of stainless steel wire of at least about 0.03 in. diameter and wound to a pitch of some 6 - 7 open turns/in. (2.35 - 2.75 turns/cm.) with an

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inside diameter slightly greater than guide rod 32 for loosely rotating relationship about the latter, being caused to rotate as labels emerge from aperture 29 and separate from the backing sheet, as will be explained.

5 Rod 32 may have a constant diameter of about 0.20 in. (5 mm.) and spring 33 extends along its length.

Carried by support plate 26 just rearwardly and beneath leading edge 28 is an idler roller 34 journaled in bearing fixtures 35 suitably affixed at opposite sides
10 of the support plate. Idler roller 34 is caused by the weight of the support plate to press the backing sheet against drive roller jacket 21 and so causing the backing sheet to be pulled taut as the drive roller turns. The tautness of the backing sheet performs in concert with
15 reduced surface area member 33, providing 100% separation of adhesive labels from backing sheet, thereby eliminating loss and waste and minimizing related expenditures and difficulties.

Positioned at an appropriate distance forward of
20 discharge guide rod 32 the actuating arm 37' of a normally closed microswitch 37 connected as shown in FIG. 8. Adhesive labels contact switch arm 37' after passing over discharge guide rod 32 and its reduced surface area contact 33, deflecting switch arm 37' such as to interrupt
25 power supply to motor M. With labels now conveniently presented for use on top of contact 33, and there reliably but lightly adhered, further discharge of adhesive labels is suitably prevented. Removal of labels by transfer to mailing pieces permits return deflection of switch arm 37'
30 and so restores power supply to motor M, causing further rotation of shaft 20 and appropriate presentation of a new set of adhesive labels over reduced surface area contact 33. Said labels again deflect switch arm 37', again

interrupting power supply, and so preventing further discharge of adhesive labels.

Manual override switch 39, connected in series with microswitch 37, is positioned upon side plate 11 to facilitate shut-off of the label dispensing machine when no labels are to be dispensed or the backing sheet supply of labels is exhausted.

Both loading and operation of embodiment A are shown in FIGS. 7A - 7C. In FIG. 7A, the machine is shown with a label-containing backing sheet b upon support plate 26 and fed beneath retainer 27 to cause an upper margin m to protrude from aperture 29. Switch 39 is positioned "off."

In FIG. 7B, support plate 26 is raised by retainer handle portion 27' to permit margin m to be positioned between idler roller 34 and drive roller jacket 21. Support plate 26 is then lowered to its position of FIG. 7A. Switch 39 is turned to its "on" position. Motor M causes roller 20 to pull the backing sheet taut over leading edge 28, causing labels l to be separated and be guided forwardly by rod 32 and its reduced surface member 33.

A label so guided will contact switch actuator arm 37' as shown in FIG. 7C to open switch 37 and interrupt power to motor M until the labels presented on member 33 are removed.

Such operation is sequential and automatic so long as there is a supply of labels being fed into the machine for dispensing in this manner.

It will be observed that guide rod 32 and its rotatable reduced surface member 33 are positioned relative to support plate 26 such that the periphery of member 33 will be substantially tangent to the plane of the undersurface of labels l as they separate from the

backing sheet b at leading edge 28. Consequently, the separated labels are caused to extend forward in a planar relationship, reliably being presented for removal without potential for adhering to the backing sheet or otherwise being entrapped in the machine. Because the spring-like character of member 33, only the periphery of its separated turns contacts the labels and so preventing the labels from tightly adhering before their removal, yet permitting adequate adhesive force to be developed for permitting inadvertent, premature label dislodgement.

Because of the novel arrangement permitting support plate 26 to be raised for loading, the new machine makes possible the effective dispensing of labels from single page backing sheets, requiring as little as approximately 0.5 in. (12.8 mm) of selvedge at the top of the sheet to be inserted by the drive roller 21 and idler 34. This avoids loss of labels which has been a problem with existing label dispensing machines. Hence, with the new label dispensing machine, such single sheets carrying labels are no longer difficult to feed.

CLAIMS

What is claimed is:

1. In a label dispensing machine for use with a backing sheet carrying adhesive labels to be dispensed automatically by the machine by peeling the labels from the backing sheet, including a frame, means carried by the frame for receiving the backing sheet carrying such adhesive labels, means for retaining the label-carrying backing sheet against the sheet-receiving surface, the surface-forming member a leading edge, roller means positioned relative to the discharge edge for receiving and grippingly engaging the backing sheet in an orientation extending in bended configuration over the leading edge, a motor for rotatably driving the roller means in a direction for pulling the backing sheet from the sheet-receiving surface over the leading edge and into the roller means to peel labels from the backing sheet, and switch means responsive to the peeled labels for controlling the motor to drive the roller means for sheet-pulling operation for causing presentment of the peeled labels at the leading edge for removal, characterized in that the machine comprises guide means for guiding the labels forwardly for presentation as they are peeled from the backing sheet at the leading edge, and reduced area contact means carried by the guide means for reliably retaining the presented labels in a lightly adhered condition for easy removal and transfer for further use.
2. An apparatus as set forth in claim 1, the guide means comprising a rod.

3. An apparatus as set forth in claim 2, the guide means comprising a rod of circular cross-section, the rod extending along and proximate to the leading edge, the contact means being moveable relative to the rod.

5 4. An apparatus as set forth in claim 3, the contact means being rotatable about the axis of the rod, the backing sheet passing between the reduced area contact means and the leading edge.

10 5. An apparatus as set forth in claim 4, the contact means being integral.

6. An apparatus as set forth in claim 4, the contact means comprising at least one spring.

7. An apparatus as set forth in claim 6, the spring having open turns.

15 8. An apparatus as set forth in claim 7, the spring having an inside diameter greater than that of the rod, the rod being of constant diameter.

20 9. An apparatus as set forth in claim 8, the periphery of the turns of the spring being substantially tangent to the plane of the undersurfaces of the labels as they are peeled from the backing sheet.

25 10. An apparatus as set forth in claim 1, further characterized in that the surface forming means comprises a support plate and means hinging the plate remotely from the leading edge for permitting the support plate to be raised for loading of the backing sheet.

11. An apparatus as set forth in claim 10, the retaining means defining a handle for raising the support plate.

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12. In a label dispensing machine for use with a backing sheet carrying adhesive labels to be dispensed automatically by the machine by peeling the labels from the backing sheet, including a frame, means carried by the frame for receiving the backing sheet carrying such adhesive labels, means for retaining the label-carrying backing sheet against the sheet-receiving surface, the surface-forming member a leading edge, roller means positioned relative to the discharge edge for receiving and grippingly engaging the backing sheet in an orientation extending in bended configuration over the leading edge, a motor for rotatably driving the roller means in a direction for pulling the backing sheet from the sheet-receiving surface over the leading edge and into the roller means to peel labels from the backing sheet, and switch means responsive to the peeled labels for controlling the motor to drive the roller means for sheet-pulling operation for causing presentment of the peeled labels at the leading edge for removal, characterized in that the machine comprises a guide rod extending along and proximate the leading edge for guiding the labels forwardly for presentation as they are peeled from the backing sheet at the leading edge, and reduced area contact means rotatable about the guide rod for reliably retaining the presented labels in a lightly adhered condition for easy removal and transfer for further use, the backing sheet passing between the reduced area contact means and the leading edge, the contact means being defined by at least one spring having open turns, the periphery of the turns being substantially tangent to the plane of the undersurfaces of the labels as they are peeled from the backing sheet, the surface forming means comprising a support plate and means hinging the plate remotely from the leading edge for permitting the support plate to be raised for loading of the backing sheet.

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FIG. 1

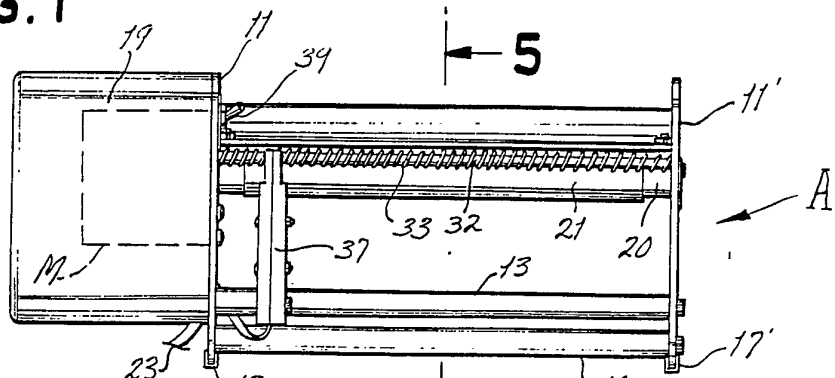


FIG. 2

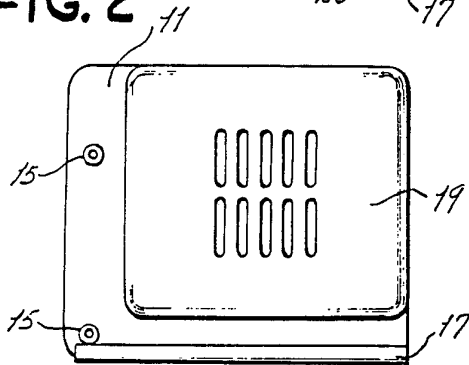


FIG. 3

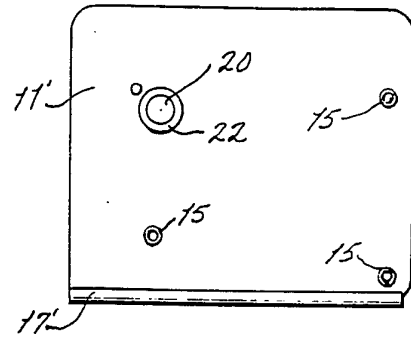


FIG. 4

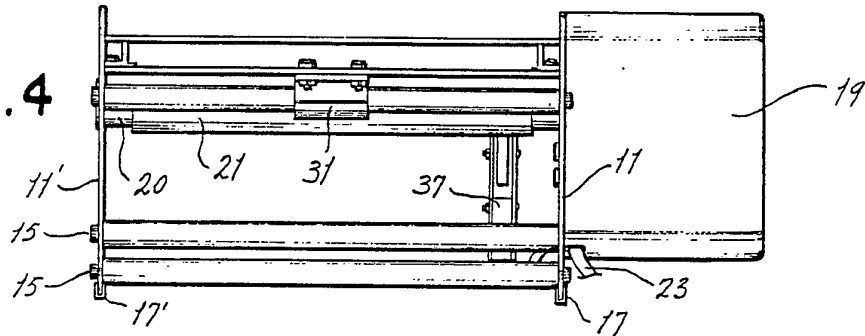


FIG. 5

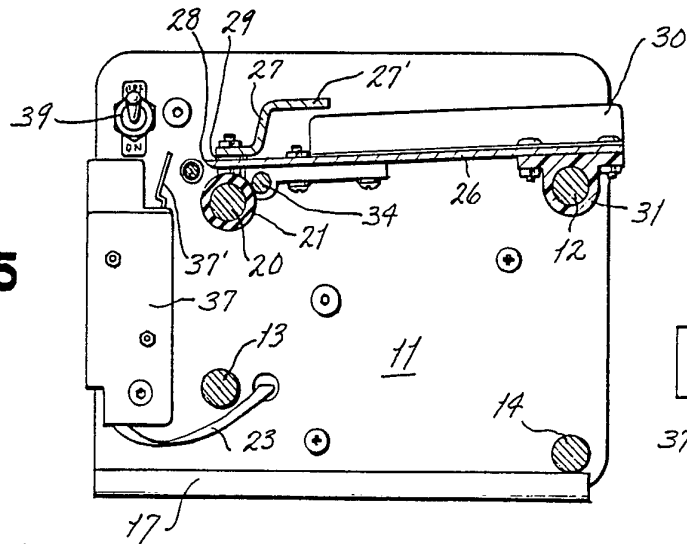


FIG. 8

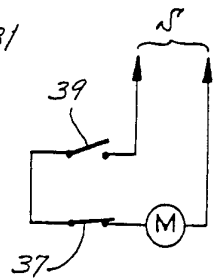


FIG. 6

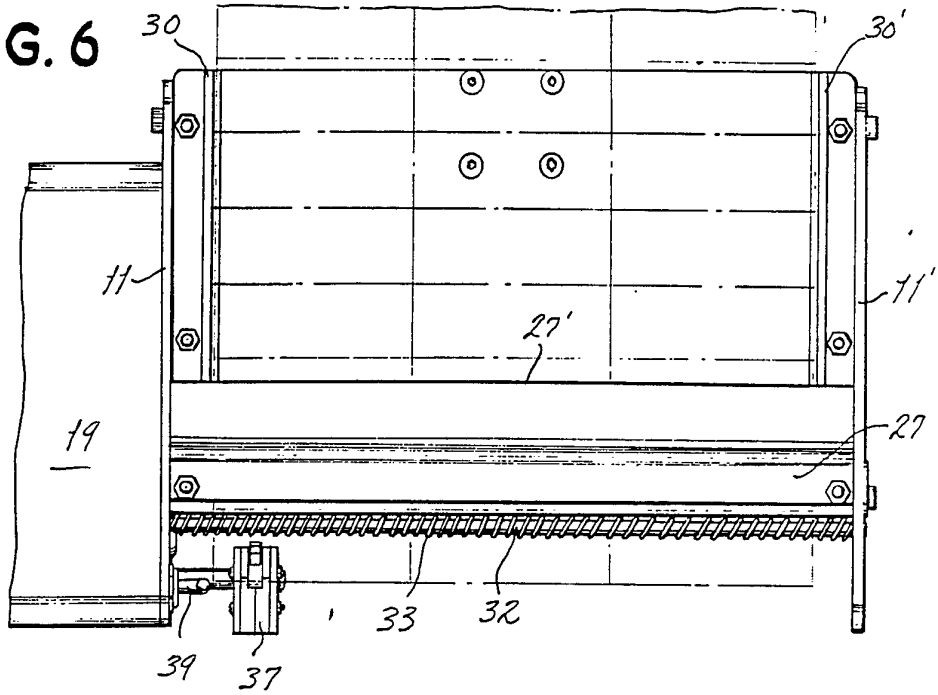


FIG. 7A

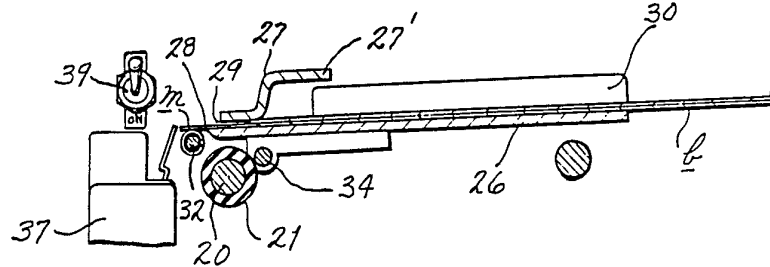


FIG. 7B

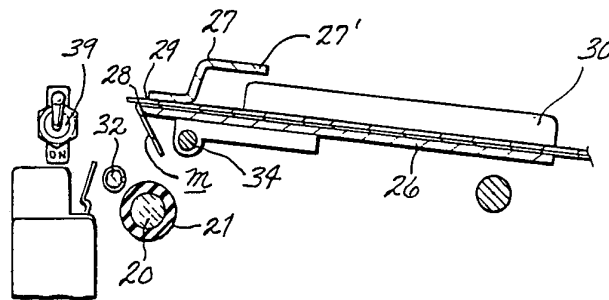
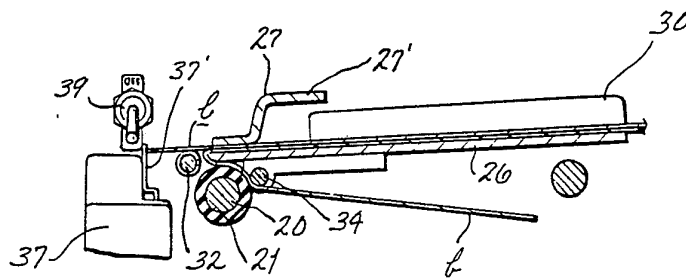
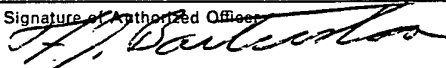


FIG. 7C



INTERNATIONAL SEARCH REPORT

International Application No. PCT/US 88/02103

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC IPC (4): B65C 9/18		
U.S. CL. 221/73		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
	221/70, 71, 72, 73, 74	
U.S.	156/584, DIG. 33	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
Y	US, A, 4,560,087, (SATO ET AL) 24 December 1985 See column 12, lines 36-60.	1-12
Y	US, A, 3,941,278, (OGLANDER ET AL) 02 March 1976 See column 3, lines 12-56.	1-12
Y	US, A, 3,066,881, (KRUEGER) 04 December 1962 See column 2, line 66 - column 3, line 5.	10, 11, 12
Y	US, A, 3,186,589, (WEST ET AL) 01 June 1965 See column 2, lines 13-29.	10, 11, 12
A	US, A, 3,991,906, (OGLANDER ET AL) 16 November 1976	
A	US, A, 4,194,646, (OGLANDER ET AL) 25 March 1980	
<p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
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