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Chlipalski

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[54] **APPARATUS FOR HANDLING LIQUID FILLED FLEXIBLE POUCHES**

[76] Inventor: **Adam Chlipalski,** 863 55th Ave., Lachine, Quebec, Canada

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[52] **U.S. Cl.** ..... **53/159,** 53/61, 53/187, 214/6 C

[51] **Int. Cl.** **B65b 35/56**

[58] **Field of Search** ..... 53/61, 159, 187, 53/385, 373, 75, 162, 163, 266; 214/6 C, 6 D

[56] **References Cited**

UNITED STATES PATENTS

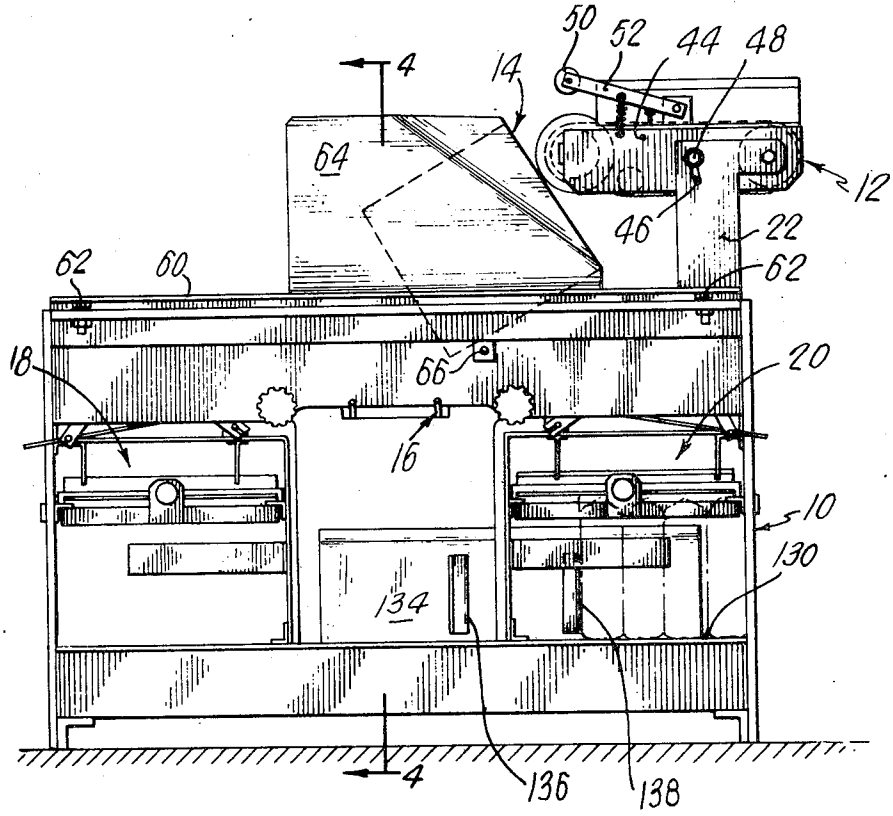
3,698,153	10/1972	Lieberman	53/61
3,604,181	9/1971	Adcox	53/61
3,585,782	6/1971	Staley	53/159
2,899,788	8/1959	Beebe, Jr.	53/187 X

Primary Examiner—Andrew R. Juhasz
Assistant Examiner—W. D. Bray
Attorney—Alan Swabey

[57] **ABSTRACT**

A liquid pouch handling apparatus which includes a pivoting cradle adapted to collect a plurality of pouches and then drop them into an outer bag held by a pair of oppositely pivoting jaws below the cradle, and sealing stations adjacent the path of the outer flexible bag and liquid filled pouches whereby tension fingers are included for engaging the open end of the outer bag and retaining it under tension while the top of the bag is being sealed by heat-sealing means.

18 Claims, 11 Drawing Figures



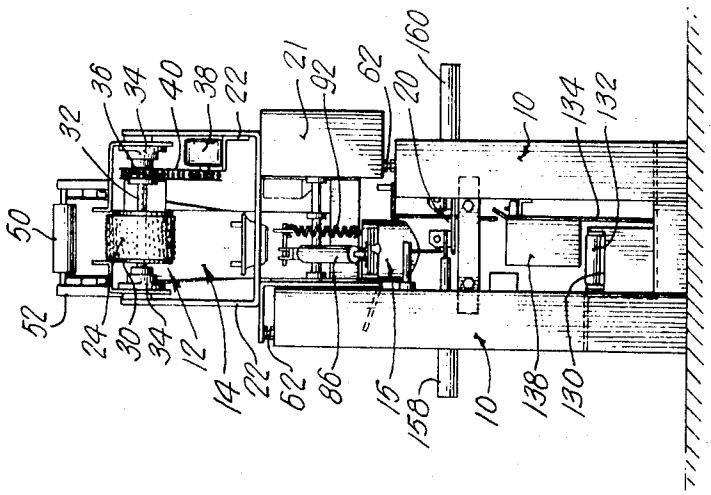

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FIG. 2

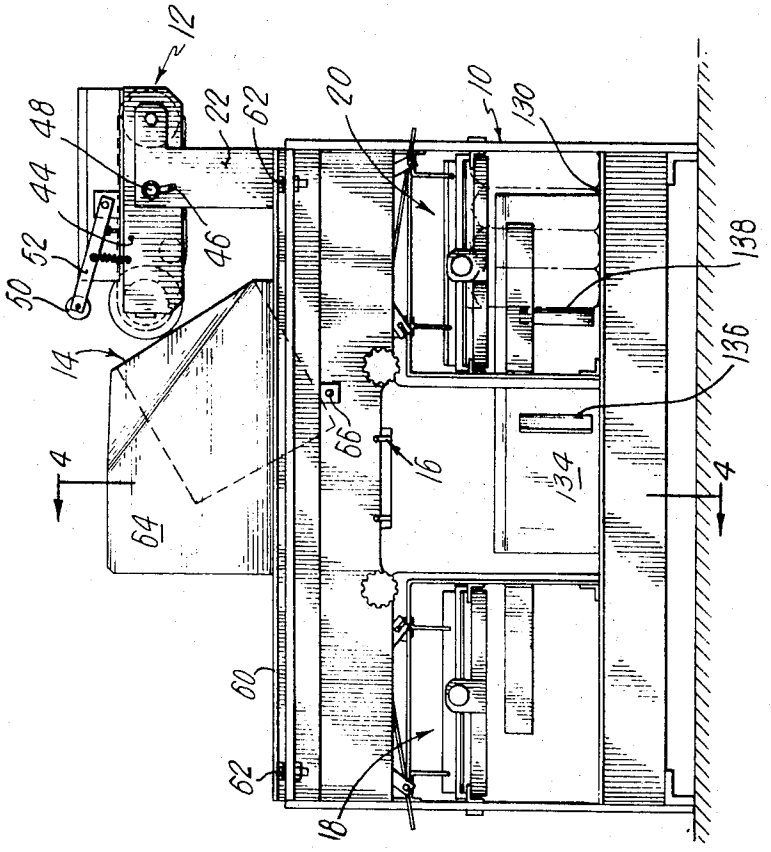

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FIG. 1

FIG. 3

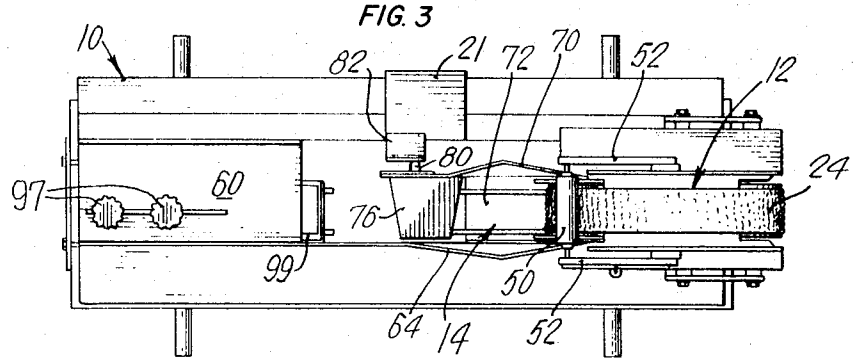
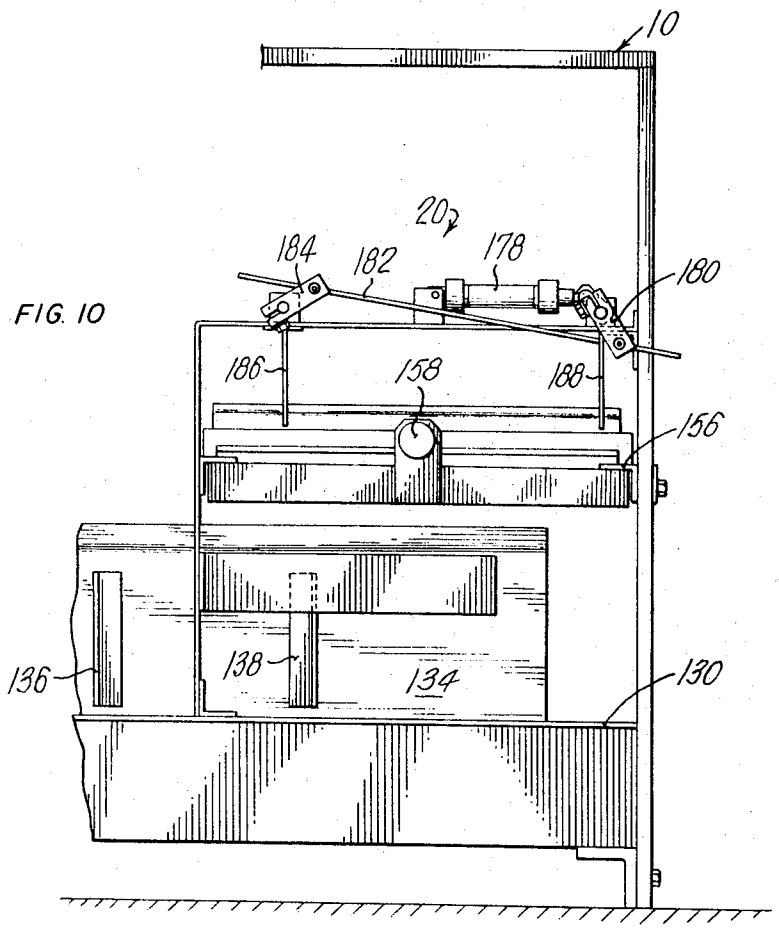

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FIG. 10


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130

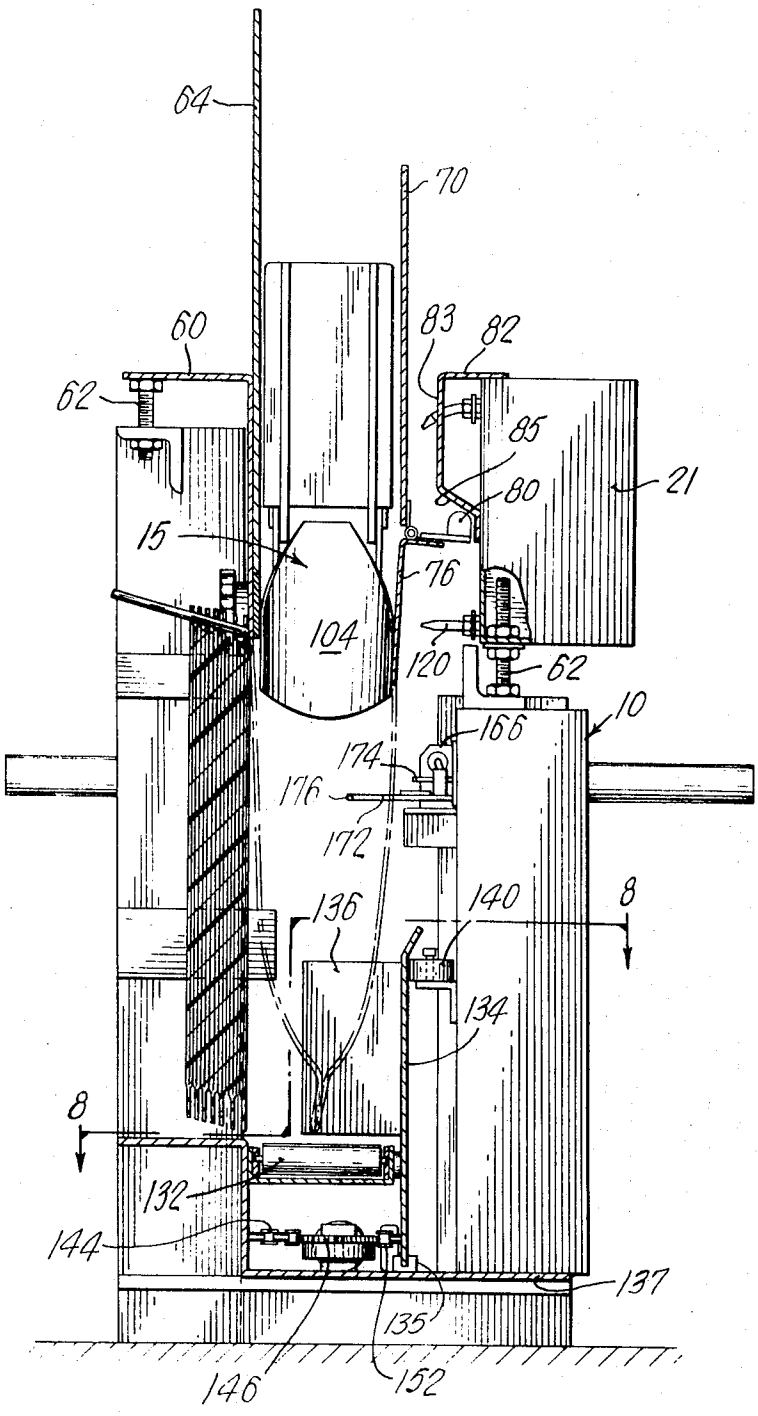

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FIG. 4

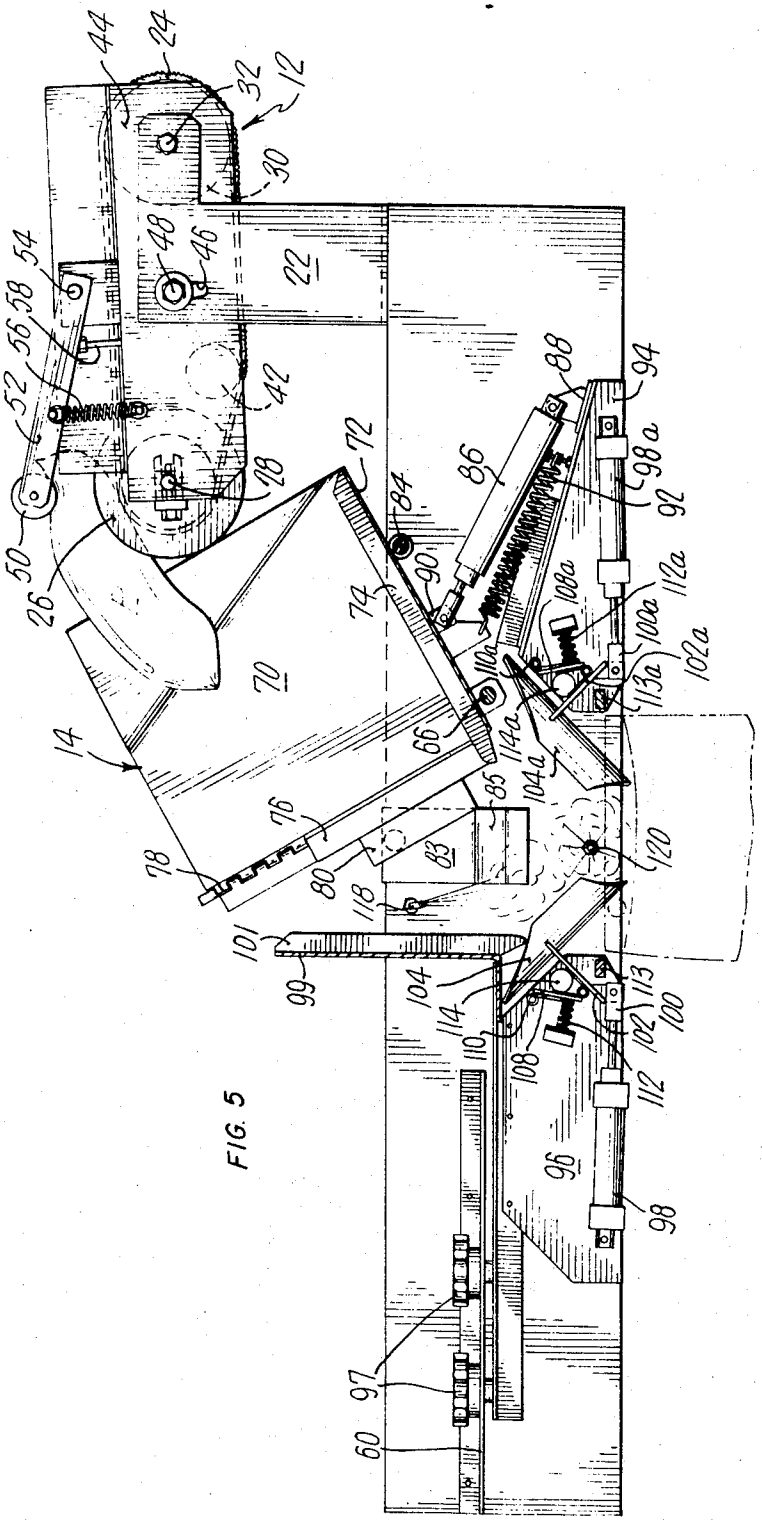

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98a
92
90
74
108a
112a
100a
102a
113a
110a
114a
104a
66
70
14
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76
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FIG. 5

FIG. 6

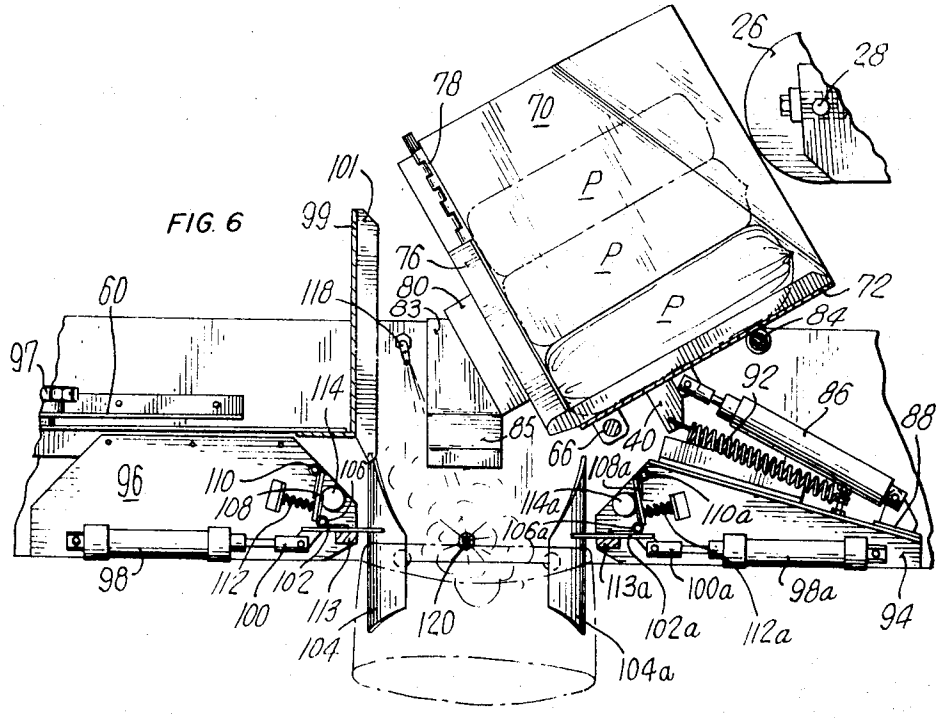

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108a
114a
110a
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113a
100a
102a
112a
98a
94
104a

FIG. 7

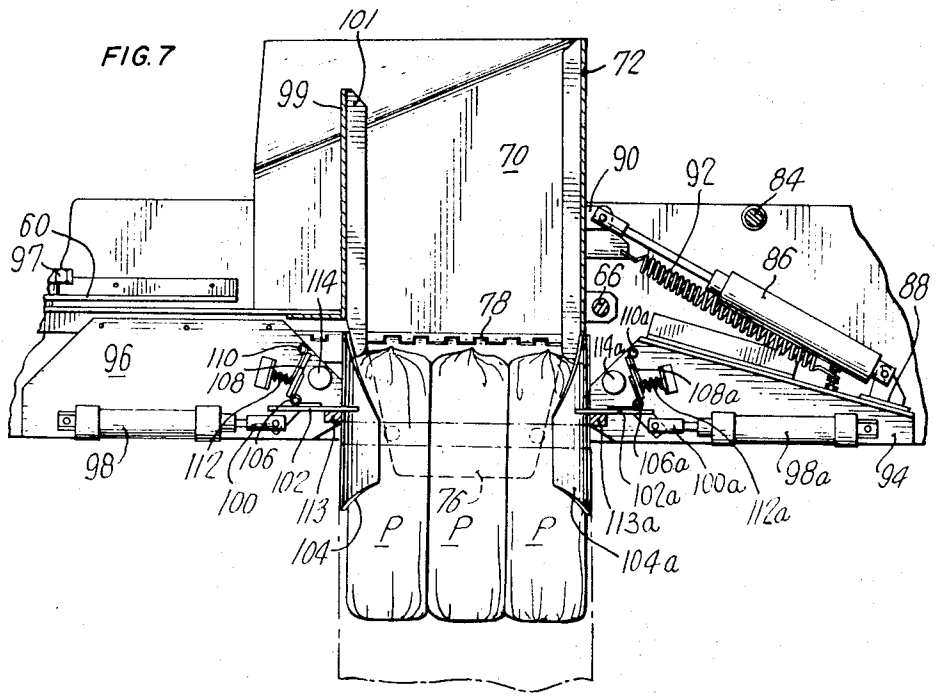

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108a
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112
106
102
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76
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106a
102a
100a
98a
94
113a
112a
104a

FIG. 8

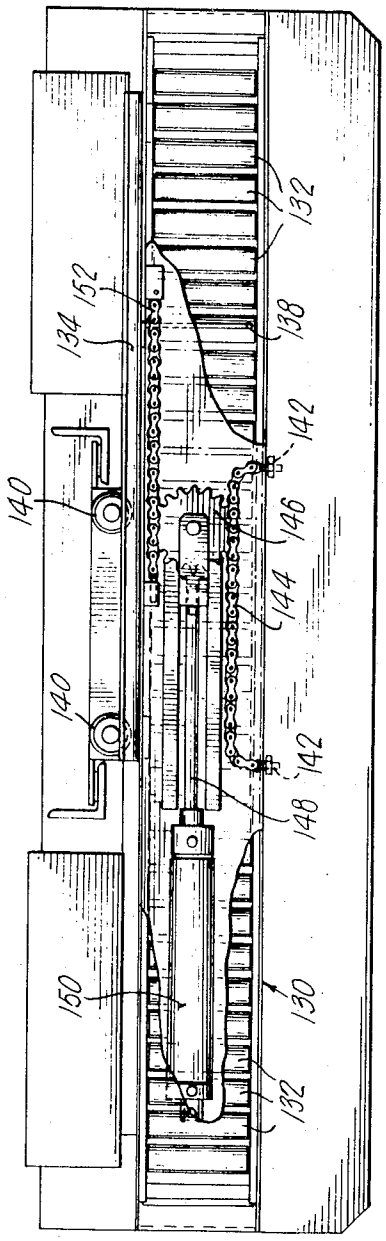
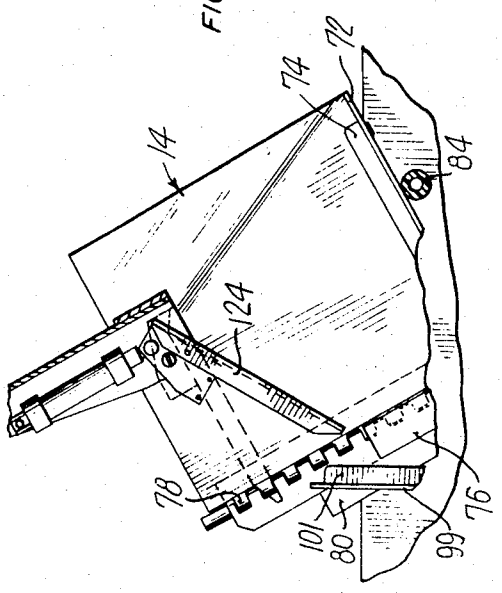

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FIG. 9


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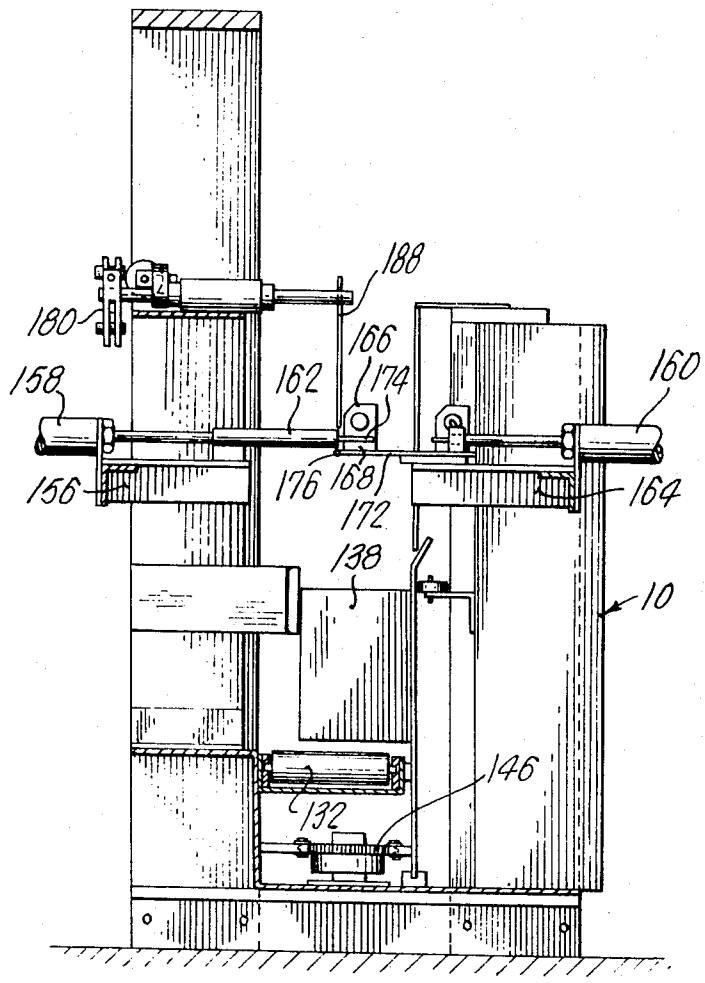


FIG. 11

APPARATUS FOR HANDLING LIQUID FILLED FLEXIBLE POUCHES

BACKGROUND OF INVENTION

1. Field Of Invention

The present invention relates to an apparatus for supplying a plurality of flexible liquid filled pouches into an outer flexible container.

2. Description of Prior Art

In recent years, many developments have taken place in the handling of liquids and the most important of these developments has been in the packaging of liquids in flexible sealed pouches or bags such as polyethylene pouches. Such pouches may be of the half-gallon, quart or smaller size and are commonly used for packaging milk and other dairy prepared liquids, petroleum products, etc. This method of packaging is considered more economical than previously used rigid containers.

However, the handling of such flexible pouches creates problems inherent in the flexibility of such pouches. For instance, it has been found preferable for distribution purposes to group two, three and even four quart size pouches of milk in a larger flexible container. However, it is not possible in conventional packaging apparatus to package a plurality of flexible pouches into a flexible outer container.

SUMMARY OF INVENTION

It is an aim of the present invention to provide an apparatus for handling and packaging a plurality of pouches in an outer bag.

A construction in accordance with the present invention comprises means for advancing and feeding a plurality of elongated articles one by one and an article receiving cradle having at least an end wall and a retractible bottom wall, means pivoting the cradle between a first position whereby said end wall is inclined from the vertical below the angle of rest of said articles and adapted to receive a plurality of articles fed from the advancing means stacked in side-by-side relation in the cradle, and a second position wherein said end wall is above the angle of rest of said articles, means adapted to retract said bottom wall when the cradle is in said second position, means below and adjacent said bottom wall when said cradle is in the second position for opening and locating a container for receiving the articles as the articles are dropped simultaneously from the cradle.

BRIEF DESCRIPTION OF THE DRAWINGS

Having thus generally described the nature of the invention, reference will now be made to the accompanying drawings, showing by way of illustration, a preferred embodiment thereof, and in which:

FIG. 1 is a front elevation of the apparatus;

FIG. 2 is an end elevation thereof;

FIG. 3 is a top plan view of the apparatus;

FIG. 4 is a vertical cross section taken along lines 4—4 of FIG. 1;

FIG. 5 is an enlarged fragmentary view of the apparatus showing a detail thereof in an operating position;

FIG. 6 is an enlarged fragmentary view similar to FIG. 5 showing a further operating position of a detail of the apparatus;

FIG. 7 is an enlarged fragmentary view similar to FIGS. 5 and 6 and showing details of the apparatus in still a further operating position;

FIG. 8 is a horizontal cross section taken along lines 8—8 of FIG. 1;

FIG. 9 is a fragmentary enlarged view of a detail of the apparatus;

FIG. 10 is a fragmentary side elevation showing a further detail of the apparatus; and

FIG. 11 is an enlarged end elevation of the detail shown in FIG. 10.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to the drawings, and particularly to FIGS. 1 to 4, the apparatus is shown having a frame 60, adjustable on a stand 10, on which there is mounted a conveyor unit 12 adapted to feed pouches P in line to a cradle 14 which in turn drops the pouches past a bag opening assembly 15 into bags held by the assembly 15. Pouches P in the bag continue to drop onto a conveying table at which time they are pushed to either side alternately to sealing units 18 and 20.

As shown more clearly in FIG. 5, the conveyor unit 12 includes a conveyor mounting bracket 22 and a conveyor belt 24. The bracket 22 mounts side walls 44 on either side of the conveyor. Conveyor belt 24 passes about adjustable tension pulley 26 rotating about stationary shaft 28, and about pulley 30 mounted about driven shaft 32. Shaft 32 rotates in bearings 34 as shown in FIG. 2. A sprocket 36 is fixed to the shaft 32 and a motor 38 is mounted on the bracket 22. A chain 40 passes over the sprocket 36 from the motor 38 to drive the shaft 32 and therefore the pulley 30. The roller 42 is provided to maintain the proper space on the belt 24 to allow for the motor mounting. The angle of the conveyor is adjustable by means of a slot 46 provided in the bracket 22, and adjustable screw 48, which when tightened maintains the conveyor at a given angle relative to the bracket 22.

A pair of pivot arms 52 which pivot about pivot axis 54 on the side walls 44 mount a roller 50. The pivot arms 52 and roller 50 are urged in a counterclockwise direction by means of a spring 56. An adjustable abutment screw 58 is provided to limit the counterclockwise movement of the pivot arms 52 and roller 50.

The cradle 14 is mounted on the frame 60, and the frame 60 is adjustable relative to the stand 10 by means of adjustment screws 62. There is a guide wall 64 on the front side of the cradle 14 which is mounted to frame 60 which together form the bearing housing for shaft 66. The cradle 14 includes a side wall 70 and an end wall 72. Teflon rails 74 are provided on the end wall 72.

There is a bottom wall 76 which is pivoted to side wall 70 by means of hinge 78. A cam follower 80 is provided on the bottom wall 76 and cooperates with cam 82 mounted to the frame 60. An abutment 84 is mounted laterally of the frame 60 to limit the clockwise pivoting movement of the cradle 14. A bracket 88 is mounted to the frame 60 and a piston and cylinder arrangement 86 which is mounted at one end to the bracket 88 and at the other end to a bracket 90 on the cradle provides the positive pivotal movement of the cradle 14 with the shaft 66. A tension spring 92 is provided between the brackets 88 and 90 urging the cradle in a clockwise direction.

In operation, the conveyor belt 24 advances the pouches one by one and they are dropped into the cradle 14 as they pass the delivery zone represented by the pulley 26. The roller 50 which is normally spaced above the conveyor 24 a distance which is slightly less

than the normal thickness of the pouch P rides over the top of the pouch P as the pouches are advanced and is effective to keep the pouches from somersaulting into the cradle. As the pouches leave the conveyor, they tend to land in the cradle with their longitudinal axes substantially parallel to the plane of the end walls **72.**

The cradle, when in a receiving position, is abutted against the abutment member **84** so that the pouches P, as they are being delivered one by one from the conveyor assembly **12,** are stacked side by side over the end wall **72.** In the position shown in FIG. **6,** the cam follower **80** abuts against the surface **83** of the cam **82** thereby retaining the bottom wall at a 90° angle to the wall **70** and closing the bottom of the cradle. As the cylinder **86** is activated to pivot the cradle **14** in a counterclockwise direction, the cam follower **80** will then follow the angled surface **85** of the cam **82** allowing the bottom wall **76** to be retracted and allowing the plurality of pouches P to drop from the cradle in unison. The cradle can be adjusted to receive two, three or even four pouches. If it is to receive more than two pouches, the bottom wall **76** can be replaced by a longer bottom eall. Similarly, the trigger **124** is actuated by the last pouch of a predetermined group to activate the cylinder **86** by means of a control circuit in the control box **21.** The position of the trigger **124** can be adjusted since it is mounted on the guide wall **64** in relation to the predetermined number of pouches in each group.

Referring now to FIGS. **5** through **7,** there is shown a mechanism for opening the outer bags in which the pouches P are to be contained. The outer bags are retained on a wicket **16** which is made up of a plate detachably connected to a side panel of the frame **60** and from which a pair of projecting pins extend and on which a plurality of outer bags are mounted. Each exposed outer bag is first blown open by nozzles **118** and **120** mounted on the frame **60** and protruding from control box **21.** The bag opening assembly will now be described in detail.

The bag opening assembly **15** includes two opposed sub-assemblies mounted on brackets connected to the frame **60.** The bracket **94** is mounted fixedly to the frame, while the bracket **96** is suspended from the frame **60** by means of adjustment screws and knobs **97.** The bracket **96** also includes an upstanding guide wall **99** which cooperates with the cradle. The guide wall **99** includes a pair of parallel teflon guide rails **101.** Since the sub-assemblies **94** and **96** of the bag opening assembly **15** are identical, only sub-assembly **96** will be described, while the corresponding parts in the sub-assembly **94** will be identified with the subscript *a.*

Referring to bracket **96,** there is provided a piston and cylinder arrangement **98** and a clevis **100** at the end of the piston rod. Arm **108** is pivoted about a fixed pivot axis **110.** An arm **102** is pivotally mounted to arm **108** through hinge **106** and a shovel-shaped jaw **104** is fixed to the end of the arm **102.** The arm **102** is also pivoted to the clevis **100** at the other end thereof. A spring **112** is also connected to the arm **108** and to the bracket **96.** Finally, an abutment projection **114** is strategically located on the bracket **96,** as will be described further.

In operation, when the cradle **14** is in its loading position as shown in FIG. **5,** the opposed piston and cylinder arrangements **98** and **98***a* are in their fully extended position such that the arm **108** is abutted against the abutment projection **114** forcing the arm **102** to retain the jaw **104** at an angle so that the bottoms of the jaws **104** and **104***a* are in close proximity. As the cradle is being filled, the nozzles **118** and **120** are, of course, activated to open an exposed outer bag. Simultaneously, the piston and cylinder arrrangements are retracted such that the jaws **104** and **104***a* will pivot downwardly into the bag and into vertical positions, as shown in FIG. **6,** since arms **102** and **102***a* pivot about the pivot point **106.** The arm **108** remains in the position shown in FIG. **6** since it is urged there by the spring **112.** The jaws **104** and **104***a* will remain in a vertical position as the arm **102** abuts against the slide block **113** and as the piston is further retracted within the cylinders **98** and **98***a*, the arms **102** and **102***a* will slide on the block **113** forcing the arms **108** and **108***a* against the springs **112** and **112***a* until the jaws **104** and **104***a* reach the position abutting the slide block **113** as shown in FIG. **7.** In this position, the jaws have expanded the mouth of the bag slightly so that the bag is securely retained by the jaws **104** and **104***a* for receiving the pouches P from the cradle as shown in FIG. **7,** when the bottom wall **76** is retracted to drop the pouches P.

It is interesting to note that the jaws **104** and **104***a* go through two subsequent movements in opening the bag, that is, first a pivoting movement such that the ends of the jaws **104** and **104***a* easily enter into the bag and then as jaws pivot to a vertical position, they are then pulled back linearly to expand the mouth of the bag.

Referring now to FIGS. **4** and **8,** the conveying table **130** includes a conveying path made up of idler rollers **132.** Below the conveying table **130,** there is provided a carriage which is made up of an upstanding side panel **134** which is adapted to move in a path parallel to the conveying path, and to which are mounted a pair of lateral panels **136** and **138,** of which panel **138** is adjustable. Both panels **136** and **138** extend across the conveying path in spaced parallel relationship.

The side panel **134** rolls along the side of the conveying path on rollers **135** on the bottom platform **137.** An elongated bearing rail may be provided on the side of the roller structure **132** abutting against the side panel **134.** Finally, guide rollers **140** engage aginst the upper portion of the side panel and support it in a vertical plane. Lateral panels **136** and **138** are mounted to the side panel **134** so that they can be adapted for different sized packages, be it with two, three or four pouch parcels. The side panel is caused to move by a mechanism provided underneath the conveying table **130** including a piston and cylinder arrangement **150** with piston rod **148** to which is mounted a sprocket **146.** A track or chain device **144** is mounted to anchor blocks **142** on the support **137.** A further track or chain **152** is mounted to the side panel **134** and as the piston rod **148** is retracted or extended out of the cylinder **150,** the sprocket **146** which travels on the fixed chain **144** will transmit the movement to the chain **152** which is fixed to the sliding side panel **134.**

Referring now to FIGS. **10** and **11,** only one of the sealing units **18** and **20** is shown, including a guide member **156** with a cylinder and piston arrangement **158** connected thereto, and to a cold plate **162** adapted to slide on the guide member **156.**

On the opposite side of stand **10** there is a guide member **164** and a piston and cylinder arrangement **160** mounted thereon for moving a heating element and housing **166** which is connected to a plate **172.** An

insulation member **168** separates the heating element housing **166** from the plate **172** and a hot bar **174** is connected to the housing **166** above the insulation. Finally, a deflection member **176** is provided on the end of the plate **172** for deflecting the part of the outer bag as the top is being sealed.

Above the sealing arrangement is an outer bag opening and tensioning device which includes a piston and cylinder arrangement **178** mounted to the frame with the piston connected to a crank arm **180** pivoted to the frame and an extension rod is connected to the crank arm **180** and to a further crank arm **184** so that the crank arms **180** and **184** will move in unison. Tension rods **186** and **188** are connected to the crank arms and move between a position inwardly thereof to a position where the tension rods move away from each other to a vertical position gripping the inside of the outer bag and holding it.

In operation, as the outer bag with the plurality of pouches P is dropped on the conveying table **130,** it is engaged by a lateral plate **136** or **138** and moved alternately either to the sealing station **18** or **20.** As it arrives in the sealing station on the rollers **132,** the tension rods **186** and **188** are pivoted downwardly and outwardly by means of the piston and cylinder arrangement **178** so as to grip the inside of the outer bag and hold it in a position to be sealed. The piston and cylinder arrangements **158** and **160** are then activated to move the cold plate **162** and the hot bar **174** towards each other thereby sandwiching the upper edge of the outer bag and, of course, sealing the edges.

I claim:

1. An apparatus for supplying a plurality of elongated articles into a container comprising means for advancing and feeding the plurality of elongated articles one by one; an article receiving cradle having at least one end wall and a retractable bottom wall; means pivoting the cradle between a first position whereby said end wall is inclined from the vertical below the angle of rest of said elongated articles and adapted to receive a plurality of articles fed from the advancing means stacked in side-by-side relation in the cradle and a second position wherein said end wall is above the angle of rest of said articles, means adapted to retract said bottom wall when the cradle is in said second position, means below and adjacent said bottom wall when said cradle is in said second position for opening and locating a container for receiving the articles as the articles are dropped simultaneously from the cradle.

2. An apparatus as defined in claim **1,** wherein the elongated articles are liquid filled flexible pouches and the container is an outer flexible bag.

3. An apparatus as defined in claim **2,** wherein the advancing means includes conveyor means for advancing the liquid filled pouches one by one, the conveyor means including a delivery zone whereby the pouches are fed into the cradle when the cradle is in its first position and the delivery zone of the conveyor means is above the end wall of the cradle when the cradle is in said first position.

4. An apparatus as defined in claim **3,** wherein a pouch stabilizing means is provided in the delivery zone of the conveyor means.

5. An apparatus as defined in claim **4,** wherein the pouch stabilizing means includes a resiliently-mounted roller spaced above the top run of the conveyor a distance less than the normal thickness of the pouch whereby when the pouch is delivered from the conveyor means, the resiliently-mounted roller will effectively prevent the elongated pouch from somersaulting into the cradle thereby allowing the pouch to drop from the delivery zone with the axis thereof substantially parallel to the plane of the end wall.

6. An apparatus as defined in claim **2,** wherein the end wall includes a bracket journalled on a pivot shaft mounted to the frame and motor means are connected to the frame and to the cradle for positively reciprocating the cradle from the first to the second position.

7. An apparatus as defined in claim **2,** wherein the cradle includes a side wall at 90° and adjacent to the end wall, the bottom wall being hingedly connected to said side wall, cam means mounted to the frame, a cam follower mounted to the bottom wall, such that when the cradle is in the first position, the cam follower and the cam means retain the bottom wall in a position at 90° to the end wall and to the side wall, closing the bottom of the cradle, and when the cradle is in said second position, the cam follower and the cam means allow the bottom wall to pivot about the hinge axis to a position in the same plane as the side wall.

8. An apparatus as defined in claim **2,** wherein the means for opening and locating the flexible container bag for receiving the articles includes a wicket means adjacent the path of fall of the pouches for supplying the outer bags, air pressure nozzle means for initially opening the outer bag from the wicket, spaced-apart opposed jaw means adapted to engage and initially open the outer bag, to fully open the bag and to retain the bag while the pouches are being dropped from the cradle.

9. An apparatus as defined in claim **8,** wherein the jaws are of shovel-shaped construction and include bottom ends, and the shovel-shaped jaws are adapted to pivot from a first position wherein the bottom ends are relatively in close proximity and a second position wherein the jaws are pivoted downwardly with the bottom ends of the jaws spaced further apart and the jaws in substantially vertical position engaging the inner periphery of the outer bag.

10. An apparatus as defined in claim **9,** wherein the shovel-shaped jaws are adapted to pivot downwardly and move linearly outwardly relative to each other, so as to both engage the inner periphery of the bag and to slightly stretch the bag thereby retaining the bag while the pouches are being dropped therein.

11. An apparatus as defined in claim **10,** wherein linkage means are provided for pivoting and moving the jaws linearly outwardly.

12. An apparatus as defined in claim **11,** wherein said linkage means are connected to a reciprocal motor means, and the linkage means includes a first arm pivoted to a fixed pivot on the frame, said first arm being hinged to a second arm fixed to the jaw at one end and to the end of the reciprocal motor means at the other end thereof, stop means being provided on the frame for limiting the movement of the linkage means.

13. An apparatus as defined in claim **2,** wherein a conveying table is provided at right angles to the path of the dropping container and pouches, and carriage means are provided on said conveying table for alternately moving a filled container in opposite directions on the conveying table.

14. An apparatus as defined in claim **13,** wherein the conveying table is provided with the surface made up

of idler rollers, and a carriage is adjacent said surface and includes abutment means for moving the container on said idler roller surface alternately in one direction and the other.

15. An apparatus as defined in claim **14,** wherein the carriage slides in guide means on the side of the idler roller surface and is actuated by a reciprocal motor means having a sprocket riding on a fixed track, and the sprocket is adapted to engage a track fixed to the carriage means.

16. An apparatus as defined in claim **13,** wherein a sealing station is provided adjacent the carriage means for alternately sealing the open end of the flexible containers.

17. An apparatus as defined in claim **16,** wherein tensioning means are provided for first engaging the open end of the flexible bag container and retaining it while it is being sealed.

18. An apparatus as defined in claim **17,** wherein said tensioning means includes a pair of elongated fingers adapted for opposite pivoting movement from a position inwardly pivoted where the ends thereof are in close relative proximity in a position outwardly relative to each other engaging the inner periphery of the outer bag.

* * * * *