

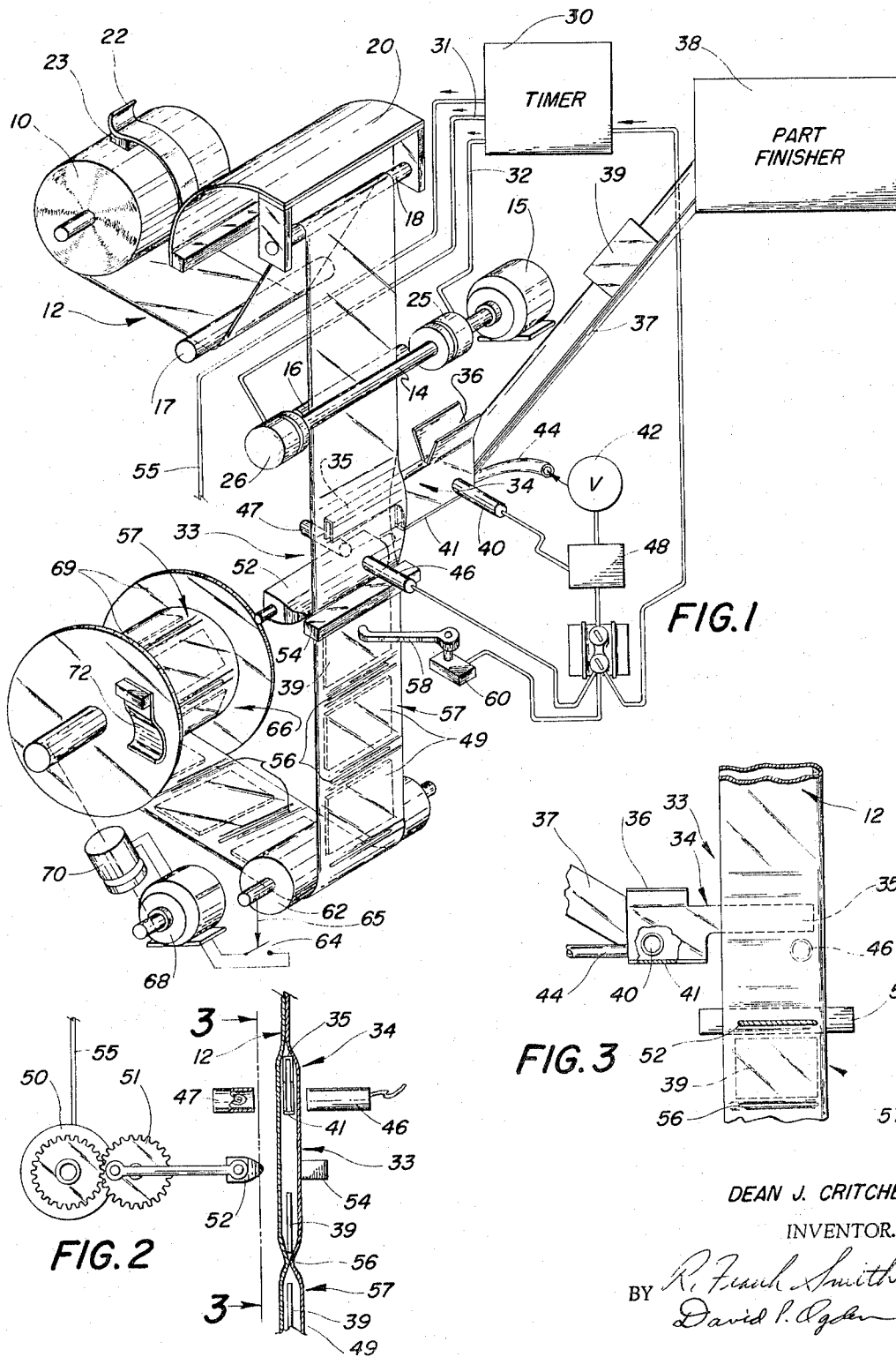
Jan. 3, 1967

D. J. CRITCHELL

3,295,289

POUCH FORMING AND FILLING METHOD AND APPARATUS

Filed Feb. 11, 1964



DEAN J. CRITCHELL

INVENTOR.

BY *R. French Smith*
David P. Ogden

ATTORNEYS

1

3,295,289

POUCH FORMING AND FILLING METHOD AND APPARATUS

Dean J. Critchell, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y., a corporation of New Jersey

Filed Feb. 11, 1964, Ser. No. 344,073
11 Claims. (Cl. 53-28)

The present invention relates to a pouch forming and filling apparatus and method and more particularly to a method and apparatus for forming and filling a plurality of adjacent pouches in a long web with items so that the items are both individually protected and readily accessible.

In the art of fillers or baggers and more specifically packaging machines utilizing polyethylene and the like thermoplastic material it is relatively well known to utilize a long web to form a series of packages by forming the web into a long longitudinal loop or a plurality of such loops, by sealing the loops laterally to thus establish separate pouches or bags and by sealing the ends of the pouches to completely enclose the items. These plastic containers are often used for transporting, displaying and handling items which would be contaminated or damaged by direct individual handling or bulk handling techniques. Many such bags are on display in retail drug and grocery stores.

However, I have discovered that somewhat similar handling of prefinished subassembly parts results in substantial reduction of damage or contamination to the finish of exposed parts or structure of fragile parts with a resulting reduction of rejects of complete assemblies using these items. Moreover, I have found that the use of completely enclosed containers as taught in the prior art is not a most suitable arrangement for handling subassembly parts.

The value of individually protecting similar subassembly parts takes into account substantial reduction of damage by abrasion, damage by deformation, damage by dirt or dust collecting thereon, and/or damage by having several adhesive coated parts prematurely adhering to each other with a result of loss of both time and parts when attempts are made to separate them.

Therefore, an object of the present invention is to provide a new and useful pouch forming and filling apparatus and method for separately storing and protecting individual subassembly items for later presentation at an assembly station.

In accordance with one embodiment of my invention a folded vinyl or polyethylene web or strip is passed downwardly through the pouch making and filling apparatus of my invention with its longitudinal location being controlled precisely by a selectively operable driving roller. Near the longitudinal center of the folded plastic strip within the forming and filling apparatus is a spreader inserter arm for opening the folded strip sufficiently to allow insertion therein of a finished subassembly item. The finished item is supplied from a finishing machine such as a punch press, a finish painting mechanism, or the like by a chute means which drops the part into a portion of the inserter where it may be sensed and driven by an air blast fully into the opened strip. Once the item is in the strip, the roller drive system is energized to move the strip downstream a predetermined distance where it stops and a lateral seal is developed upstream of the item by a heating means. When the lateral seal is completed, the strip is prepared to receive a next item. As several parts are placed in the now pouched strip, it is wound on a reel which provides large flanges to prevent the loss of items

2

through the open end of the pouches formed by the series of lateral seals. As will become apparent by study of my co-pending application for Letters Patent of the United States, Serial Number 344,152, filed February 11, 1964, now Patent No. 3,260,404, the provision of such pouched strips provides distinct advantages over bagged or separated item containers. As will become apparent from brief perusal of that disclosure, not only are items protected by being placed in separate pouches, but also such handling of subassembly items results in considerable time savings at the assembly station where the subassembly items are individually presentable in a predetermined orientation whereby the assembler's handling motions are both consistent and reduced compared to bulk handling of such subassembly parts.

The subject matter which is regarded as my invention is particularly pointed out and distinctly claimed in the concluding portion of this specification. The invention, however, as to its organization and operation, together with further objects and advantages thereof, will best be understood by reference to the following description taken in connection with the accompanying drawing, in which:

FIG. 1 is a simplified perspective view of one embodiment of my invention;

FIG. 2 is a detailed side view of a portion of the arrangement shown in FIG. 1; and

FIG. 3 is a cross section view taken along the line 3-3 of FIG. 2.

Referring now to the drawing, wherein like numbers refer to similar parts, in FIG. 1 I have shown a folded polyethylene web supply reel 10 with a folded web or strip 12 being pulled therefrom by a drive roller 14 under the control of a motor 15. In order that the drive roller 14 may be effective to pull the folded strip 12, a backup roller 16 is forced thereagainst by spring means (not illustrated).

Also to reduce inertia problems in connection with the driving of the folded strip 12 and the mass of the supply reel 10, the strip 12 is passed over a guide roller 17 and what is often referred to as a dancer roller illustrated as a guide roller 18 journaled on a relatively stiff spring means 20. Thus when the strip 12 is driven downward by the drive roller 14, the springs 20 is flexed and thereby provides continued tension to unwarp the strip 12 from the supply reel 10. In order to prevent the supply reel 10 from rotating continuously, a somewhat similar spring means 22 is used to bias a pad 23 against the supply reel 10 and prevent its unwinding in the absence of substantial tension in the spring 20.

The precise driving of the strip 12 by the motor 15 is regulated by a pair of clutch means. A first clutch means 25 is a magnetic clutch which may be operated to transmit torque only when energized, and a second clutch means is a magnetic brake 26 which will prevent rotation of the drive roller 14 when energized.

These clutch means are energized, as are several other mechanisms of the present invention, in accordance with the operation of a timer 30. I prefer that the timer 30 be electronic circuit equipment, precisely timed and easily regulated. However, other timers as are known in machine equipment controls may be made to operate effectively with my invention. Obviously the signals passed over the wires 31 and 32 to the clutches 25 and 26 are mutually exclusive in the sense that only one signal is developed at a time, whereby when the clutch 25 is energized to drive the roller 14, the brake 26 is de-energized so that the roller 14 may be driven and when the brake 26 is energized, the clutch 25 is de-energized.

As the folded strip 12 proceeds downward to a filling station 33 its open edge passes on both sides of a spreader inserter 34 which has a portion 35 thereof extend a sub-

stantial distance inwardly between the two sides of the folded strip 12 so that spreading of the strip is assured. At an input end 36 of the spreader inserter 34 is attached a supply chute 37 coupled to a part finisher 38 shown in the block form. The part finisher 38 may be a punch press, a relief etching device, or the like. As an item 39 is finished and presented to the chute 37 it slides downwardly into the rear portion or input end 36 to rest momentarily on a platform 41 at the input end 36 of the spreader inserter 34 where it is sensed. My invention is arranged to operate at velocities greater than those at which items 39 are finished.

One sensing means specifically illustrated is a photodetector arrangement 40 which, when the item 39 is in front thereof, develops a signal to energize a valve 42 to supply air to a nozzle 44 which results in an air jet to blow the item 39 through the inserter into the region of the arm 35. Another sensing means, again illustrated in the form of a photodetector 46, senses the arrival of the item 39 within the folded strip 12 near the end of the arm 35. The item 39 in the region of the photodetector 46 blocks light flux from a lamp 47 whereupon the air valve 42 is de-energized. Preferably the air valve 42 is operated by means of a magnetic or electric drive mechanism 48.

At the same time the arrival of the item 39 is sensed within the folded strip 12, a signal from the photodetector 46 is applied to the timer 30 to advance the drive roller 14 and the strip 12 a predetermined distance in accordance with the timing of the operation of the magnetic clutch 25 and the brake 26 in a preselected manner. In order that the item 39 does not lose its orientation within a pouch 49, I prefer that the amount of advance is less than the longest diagonal of the item 39.

As soon as the strip 12 has advanced a predetermined distance corresponding to the width of the pouches being formed, the brake 26 is re-energized to stop the strip. Each time the strip 12 is stopped, a one-revolution clutch 50 (FIG. 2) at a forming station is energized to drive, by means of an eccentric gear 51, a heat sealer 52 against the web in the region of a backup bar member 54. This lateral seal pouch-forming operation initiated by the signal line 55 (FIG. 1) results in the individual pouches 49. The temperature of the heat sealer 52 and the duration of its contact with the strip 12 is selected to provide a lateral seal as indicated at 56 in the strip 12 between the item 39 previously presented and the item 39 to be presented by a next operation of the air jet nozzle 44. Thus each pouch 49 is completed and a pouched web 57 is developed.

The particular type of item 39 illustrated is a relatively thin and flat faceplate member which is most easily sensed by a photodetector. However, my invention is readily adapted to protect and store thick finished parts which do not have as large a surface as the faceplate member whereupon a mechanical feeler of the type illustrated at 58 develops a signal in a microswitch 60 to de-energize the valve 42 and initiate operation of the timer 30 to advance the folded strip 12. When storing smaller parts, the timer 30 is adjusted to provide smaller pouches 49, again to prevent loss of orientation.

In order to maintain tension of the strip 12 during advance thereof and during the sealing operation, a lower dancer roller 62 is provided. This roller 62 is preferably of a circumference which will not unduly bend the items 39 within pouches 49 of the pouched strip 57 and of a mass which will assist the drive roller 14 in compressing the spring 20. The bearing arrangement of the dancer roller 62 is such that in a lower position it activates a switch 64 as indicated by an arrow 65 to drive a takeup reel 66 by means of a motor 68.

As is apparent from FIG. 1, the reel 66 is provided with large circumferential flanges 69 which maintain the pouched strip 57 in a relatively tightly coiled manner and closely engage the open ends of the pouches 49 to prevent loss of items 39. Moreover, as explained in my

above-mentioned co-pending patent application, this containment enhances use of the pouches 49 to thereby simplify automatic presentation of the item to an assembler. A simple arrangement for driving the reel 66 is by means of a magnetic clutch 70. Thus, the torque developed by the motor 68 need not be applied to the reel 66 except when the dancer roller 62 closes the switch 64. At other times the reel 66 may remain dormant. However, the weight of the pouched strip 57 including the items 39 is usually sufficient to tend to unwind the reel 66 particularly in view of the effective weight of the dancer roller 62. In order to prevent continual operation of the magnetic clutch 70, I have provided a brake means in the form of a tension spring member 72 for preventing unwinding of the reel 66.

Although the above description explains the operation of my invention in some detail, FIG. 3 illustrates more clearly the lateral seals 56. By design, the seals 56 do not extend from the fold of the web to the cut edges. Instead, a space is left at both ends. The space near the fold is for the purpose of allowing an air jet supply means of the part dispenser to be inserted behind each item to selectively blow items 39 from the pouches 49 as they are needed. Also leaving one end of the pouch open allows removal of the parts without the addition of a slitting or other bag opening step which often turns out to be difficult to keep in calibration because of alignment problems of the polyethylene webs. The gap of the lateral seal 56 near the mouth of each pouch is preferred to further enhance item removal.

While I have shown and described particular embodiments of the present invention, other modifications may occur to those skilled in this art. I intend, therefore, to have the appended claims cover all modifications which fall within the true spirit and scope of my invention.

I claim:

1. A pouch forming and filling apparatus comprising: means for supplying a folded strip of sealable package material;
2. means for spreading a major lateral portion of the folded strip;
3. means for inserting an item into the strip within the spread portion thereof;
4. means for controllably advancing the strip;
5. means for developing a lateral seal above the inserted item after each advance; and
6. means for storing the filled pouched strip in a narrow container whereby the items will not escape from the open end of the pouches formed therein.
7. A pouch forming and filling apparatus as in claim 1 wherein said advancing means includes an intermittently operable drive roller coupled at one end to a selectively operable clutch and coupled to a selectively operable brake, the clutch and the brake being arranged to be energized alternately depending upon the presence of an item directly above the most recent lateral seal of the folded strip.
8. A pouch forming and filling apparatus as in claim 1 wherein the lateral sealing means includes a heated member drivable against the folded strip by a one-revolution clutch with the clutch being energized only when the strip is stopped.
9. A pouch forming and filling apparatus comprising: means for supplying a folded strip of sealable package material;
10. means for spreading a major lateral portion of the folded strip;
11. means for inserting an item into the folded strip within the spread portion thereof;
12. means located above the spreading means for controllably advancing of the strip;
13. means for developing a lateral seal above the inserted item after each advance;
14. means located below the seal means for maintaining tension in the folded strip throughout the region of said spreading means and said seal means; and

5

means for placing the filled pouched strip in a narrow container whereby the items will not escape from the open end of the pouches formed therein.

5. A pouch forming and filling apparatus as in claim 4 wherein said advancing means includes an intermittently operable drive roller for pulling the folded strip from a supply reel, with spring means being compressed thereby to reduce the size of a loop of the folded strip maintained by the spring means whereupon the reel supplies strip material to replenish the loop during a period substantially greater than the period of operation of said advancing means.

6. A pouch forming and filling apparatus as in claim 4 wherein the lateral sealing means includes a heated member drivable intermittently against the folded strip only when the strip is stopped, and having an active surface arrangement that does not laterally seal the folded strip to the fold of the strip, thereby providing adjacent to the fold a substantial passage between the pouches.

7. A pouch forming and filling apparatus comprising: a reel for supplying a thermoplastic folded strip; an intermittently drivable drive roller for driving the folded strip;

a dancer roller means allowing said drive roller to drive intermittently the folded strip faster than it is pulled from said reel;

an inserter arm for spreading a major lateral portion of the folded strip;

a platform associated with said arm for supporting an item;

an air nozzle operable to move the item from said platform into the folded strip within the spread portion developed by said arm;

means for detecting the item within the strip to provide a signal for energizing said drive roller to advance the folded strip a predetermined distance;

heater means for developing a lateral seal above the inserted item after each advance with the lateral seal leaving a substantial opening adjacent to the fold and forming thereby a pouch to restrict motion of the item therein; and

means for placing the filled pouched strip in a narrow container whereby the items will not escape from the open end of the pouches formed.

8. A pouch forming and filling method comprising the steps of:

intermittently driving a continuous, heat-sealable, folded web member;

spreading the folded web member as it passes a filling station;

6

inserting an item in the spread portion of the web member at the filling station;

advancing the web member to a pouch forming station; laterally sealing the web member in back of the item just inserted therein; and

storing the pouched web member in a container having closely fitting side members to contain the items in the pouches.

9. A pouch forming and filling method as in claim 8 wherein the inserting step includes the steps of:

detecting an item at the filling station;

blowing the item into the spread web; and

detecting the item within the spread web prior to initiating the advancing step.

10. A pouch forming and filling method comprising the steps of:

intermittently driving a continuous thermoplastic folded web;

spreading the folded web in the region of a filling station;

detecting an item at the filling station;

blowing the detected item into the spread portion of the web;

detecting the item in the folded web;

terminating the blowing step;

advancing the web to a lateral sealing station;

laterally sealing the web in back of the item just inserted therein to form a pouched web with each pouch containing an item; and

storing the pouched web in a container having closely fitting side members to contain the items in the pouches.

11. A pouch forming and filling method as in claim 10 wherein said lateral sealing step provides a seal that is shorter than the width of the web to thereby provide a substantial aperture between pouches adjacent to the fold of the folded web.

References Cited by the Examiner

UNITED STATES PATENTS

2,248,471	7/1941	Stroop	53—180 X
2,265,075	12/1941	Knuetter	53—28 X
2,269,532	1/1942	Howard	53—64 X
2,390,071	12/1945	Barnett	53—182 X
2,931,148	4/1960	Smith	53—28
2,971,303	2/1961	Simjian	53—28
3,006,122	10/1961	Weishaus	53—182

50 GRANVILLE Y. CUSTER, JR., *Primary Examiner.*