

[54] **AUTOMATIC BAG FILLING METHOD**

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[21] Appl. No.: **150,276**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 132,808, April 9, 1971, Pat. No. 3,699,746, which is a continuation of Ser. No. 727,545, May 8, 1968, abandoned.

[52] U.S. Cl. **53/29, 53/187, 53/384**

[51] Int. Cl. **B65b 43/12**

[58] Field of Search **53/28, 29, 37, 180, 53/183, 186, 187, 191, 384**

[56] **References Cited**

UNITED STATES PATENTS

3,583,127	6/1971	Marchand.....	53/187 X
3,492,783	2/1970	Dohmeier	53/186

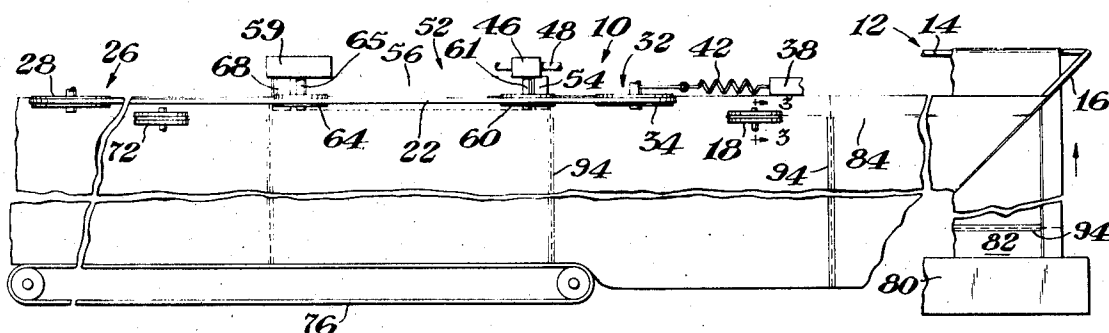
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[57] **ABSTRACT**

Method wherein guide means "track" a continuous thickened profile formed along the top edge portion of a chain of bag elements to accurately guide the bags as the same are advancing into the apparatus for filling. Such a profile can comprise a bag fastener such as a continuous bead receivable in a groove member, the fastener normally being associated with freely spreadable flaps between which the bag elements are filled. The guide means are preferably assisted by opposed continuous belts movably supporting the bags along the flap region thereof. The belts can further cooperate with collapsible spout means for separately gripping the flaps, and employing the same as tab means to open the fastener for filling; and the fastener is later automatically closed such as between a pair of grooved pressure rollers.

4 Claims, 7 Drawing Figures



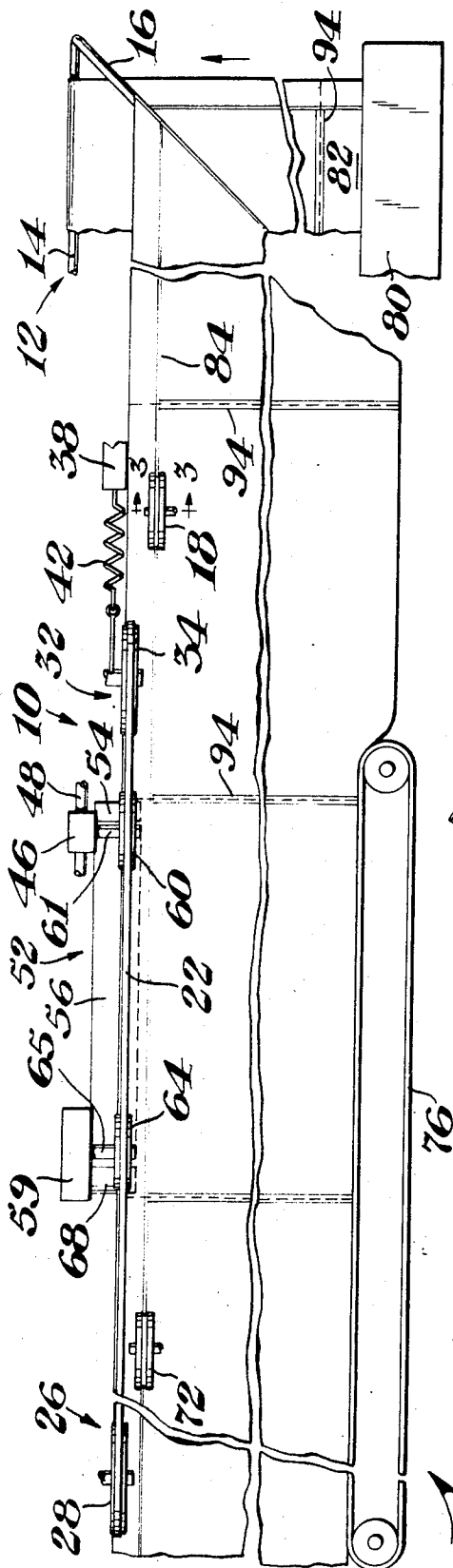


Fig. 1

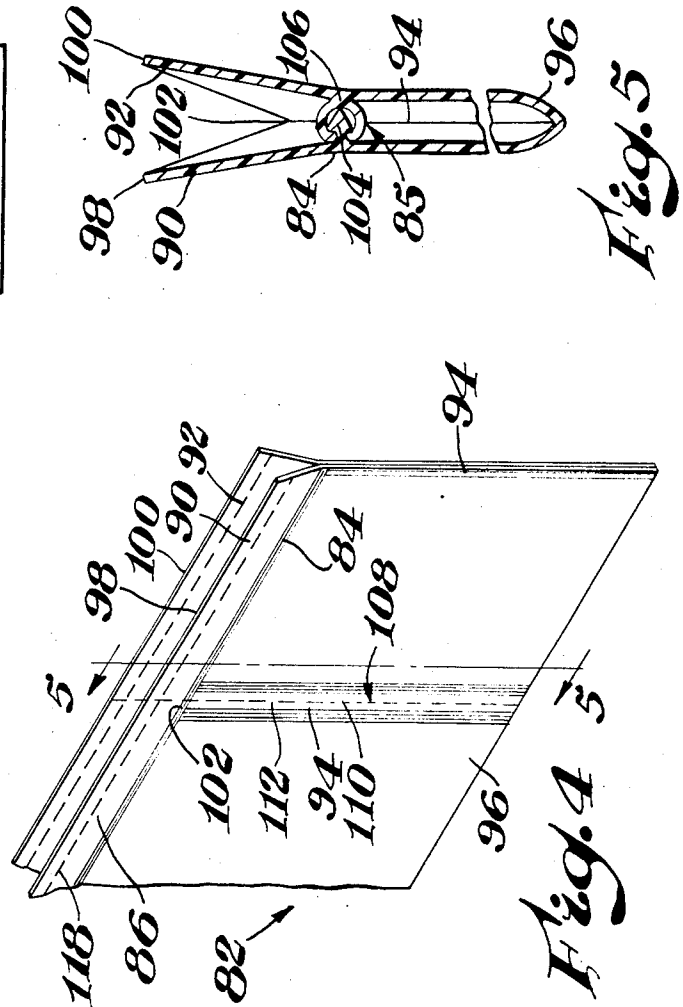


Fig. 4

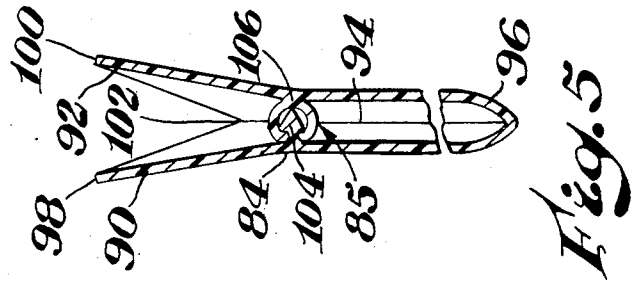


Fig. 5

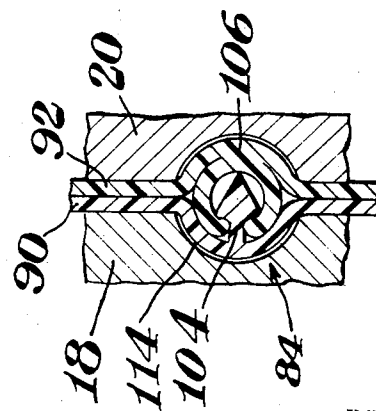


Fig. 3

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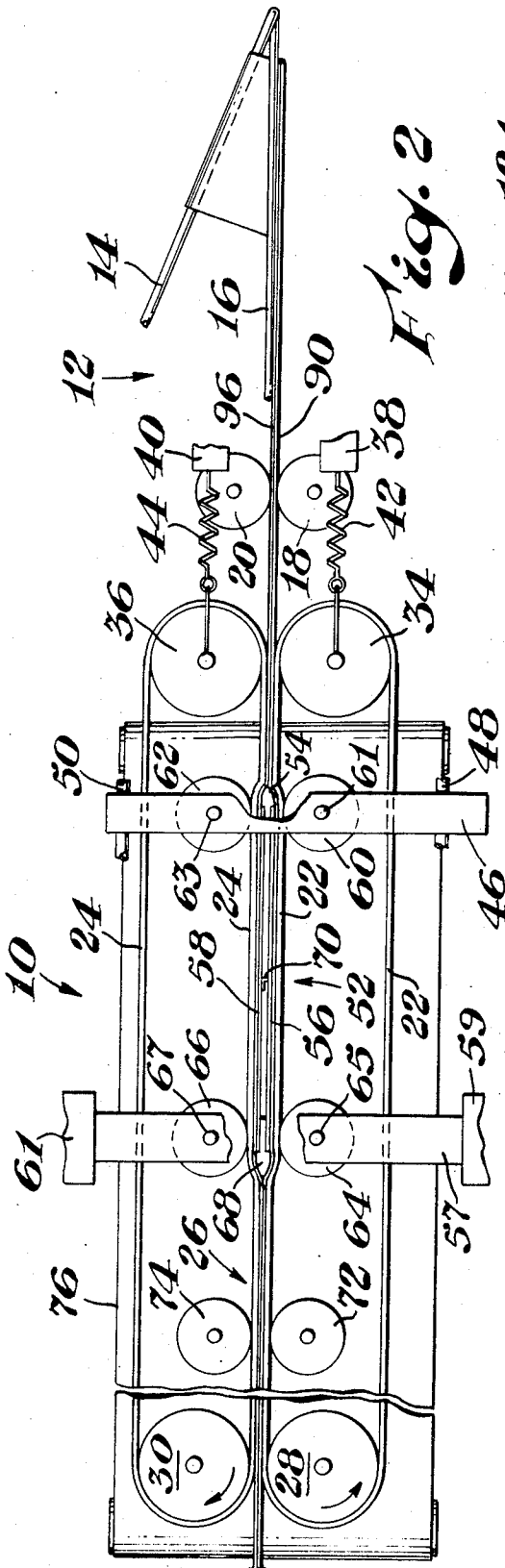


Fig. 2

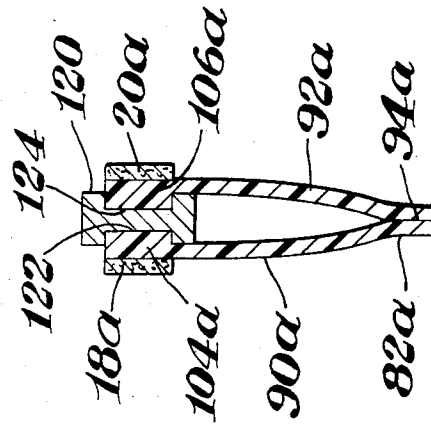


Fig. 6

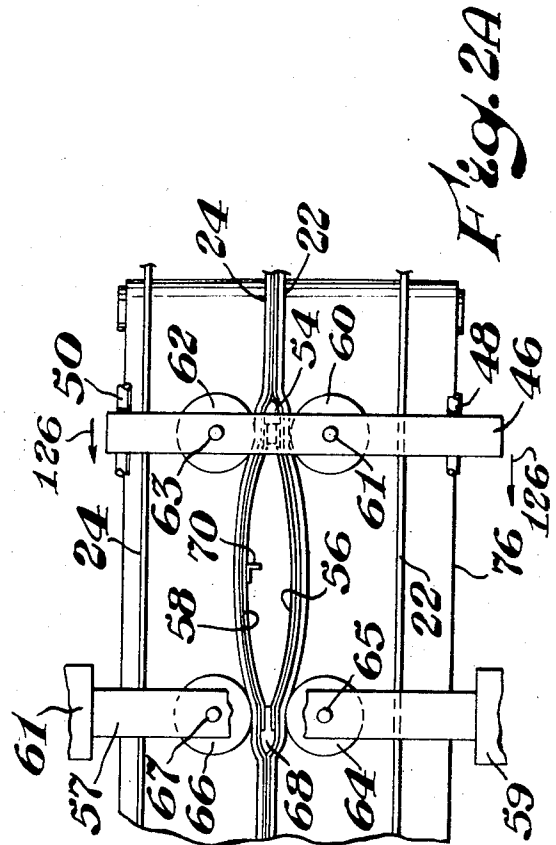


Fig. 2A

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AUTOMATIC BAG FILLING METHOD

This application is a continuation-in-part of copending application Ser. No. 132,808, filed Apr. 9, 1971, now U.S. Pat. No. 3,699,746, which was a continuation application of application Ser. No. 727,545, filed May 8, 1968, now abandoned.

BACKGROUND OF THE INVENTION

Closing of bags after filling has been particularly troublesome with prior techniques and automatic filling apparatus. For example, residual product or debris from the product frequently contaminates the sealing area such that heat sealing of thermoplastic layers is difficult. Even if this problem is overcome, automatic bag filling apparatus of the various types available before this invention have oftentimes been too expensive for packaging low volume or season products. Moreover, other than from the cost standpoint, complicated packaging apparatus requires experienced operators and maintenance personnel to keep the apparatus operating at optimum efficiency.

Understandably, therefore, automatic bag filling apparatus simple to operate but yet reliable fills the need of many packagers as well as opens up new areas for automation. For example, it is disclosed in our copending application Ser. No. 727,545 filed May 8, 1968, that automatic filling apparatus can be provided without requiring roll feed, or a station to cut the bags apart after filling, the bags in this instance being fed to the filling apparatus in the form of a continuous chain. The present application embellishes upon the teachings in our aforesaid application by providing means for solving the difficult problem of closing bags whose sealing surfaces have been contaminated, and therefore, do not seal well. Additionally the present application discloses a unique method of indexing the bags into the apparatus which method cooperatively assists in solving the aforesaid bag closure problem.

Accordingly, it is among the objectives of the invention to provide the following:

Method and apparatus employing guide means for engaging a thickened profile along the top edge portion of a chain of connected bag elements for efficiently and automatically indexing the bags to a bag filling station.

Such method and apparatus wherein the thickened profile comprises a bag fastener such as a continuous bead receivable in a groove member, the apparatus and method including means to automatically open the fastener for filling the bags, and thereafter means for automatically "relocking" the fastener so that the bags can be closed without requirement of heat sealing.

Such method and apparatus incorporating collapsible spout means which among other advantages, assists in automatically opening the bags for filling.

DESCRIPTION OF THE DRAWINGS

The preferred embodiments of the present invention are shown in the accompanying drawings wherein wheresoever possible like reference numerals designate corresponding materials and parts throughout the several views thereof in which;

FIG. 1 is a side elevational view schematically illustrating apparatus for accomplishing the objectives of the present invention;

FIG. 2 is a top view of the apparatus of FIG. 1;

FIG. 2a is a view like FIG. 2 only with certain parts broken away and showing a collapsible filling spout in the open position;

FIG. 3 is a cross-sectional view of an apparatus of FIG. 1 taken along references line 3—3 thereof;

FIG. 4 is an isometric view of a chain of bag elements exemplary of the type of bags applicable for use with the apparatus of FIG. 1;

FIG. 5 is an enlarged partial cross-sectional view taken along reference line 5—5 of FIG. 4; and

FIG. 6 is a view like FIG. 3 only showing a modified form of the invention.

BRIEF SUMMARY OF THE INVENTION

Briefly then, the invention contemplates improved methods and apparatus wherein guide means such as grooved nip rollers index a chain of bags into filling apparatus by continuously "tracking" a thickened profile or section formed into the bags for this purpose. Normally, the bag tops comprise freely spreadable flaps. In operating the apparatus, the rollers automatically guide the bags to a filling station assisted preferably by opposed continuous belts moveably supporting the bags by gripping therebetween the aforesaid flaps. Thereafter, the flaps are continuously plowed open so as to move about suitable spout means; and are gripped separately between the opposite sides of the spout means and the belts, respectively. Where the profile comprises a zipper-type fastener, a collapsible spout is used which assisted by the gripping belts, employs the flaps as tab means to open the fastener for filling, and later the fastener is automatically closed such as between a second pair of grooved pressure rollers. Thus the requirement of heat sealing the bags closed can be avoided together with the problem of heat sealing through contaminated surfaces. In yet other embodiments of the invention, the profile comprises a thickened region which, because of its mass, is oftentimes able to seal through even contaminated surfaces. As will be appreciated hereinafter, such apparatus and method provide simplicity in automatic bag filling and closure apparatus.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now more particularly to the drawings there is shown in FIGS. 1 and 2, bag filling apparatus 10 including a bag indexing station 12 comprising a horizontal bar 14 strategically arranged with a lower diagonal bar 16; and cooperative with a first pair of grooved idler rollers 18 and 20 located generally immediately forward thereof.

A pair of opposed continuous gripping belts 22 and 24 are operated horizontally starting at a region forward of and slightly above idler rollers 18 and 20. Belts 22 and 24 are driven at their far end 26 by drive pulleys 28 and 30, respectively. At their opposite end 32, belts 22 and 24 travel around idler pullers 34 and 36 spring loaded such as by means of stationary supports 38 and 40, and spring means 42 and 44. Pulleys 34 and 36 are operated by a reversely moveable bar 46 positioned forward thereof, and which is slidably carried at its ends in bearing guide means 48 and 50, respectively. Bar 46 additionally operates collapsible spout means 52 through its attachment to the forward end of the spout means via bracket means 54. A second bracket means 68 rigidly connects the back end of spout means 52 to a horizontally disposed frame member 57 which

in turn, is rigidly attached at its ends to fixed supports 59 and 61, respectfully. Spout means 52 comprises, for example, opposed walls 56 and 58 formed such as of sheets of spring steel, and moveable from a rest or collapsed position as shown in FIG. 2, to an open position as shown in FIG. 2a. A spacer 70 is affixed to the inside surface of sheet 56 and slightly separates sheets 56 and 58 in the rest position.

A first pair of idler squeeze pulleys 60 and 62 are rotatably attached such as by means of shafts 61 and 63 to the underside of bar 46 adjacent the forward end of spout means 52. A second pair of idler squeeze pulleys 64 and 66 are rotatably attached to the underside of rigid frame member 57 such as by similar shafts 65 and 67, and cooperate with pulleys 60 and 62 to assist belts 22 and 24 to snugly pass about walls 56 and 58, respectfully, of the spout means.

A second pair of grooved idler rollers 72 and 74 are located horizontally level with the first pair of idler rollers 18 and 20, and in the region intermediate drive pulleys 28 and 30 and the second pair of squeeze pulleys 64 and 66. A horizontal bottom conveyor means 76 is located a spaced distance beneath gripping belts 22 and 24, and extends from a region forward of spout means 52 to a region generally contiguous with drive pulleys 28 and 30.

EXEMPLARY BAG CONSTRUCTION AND PREFERRED METHOD OF FEEDING SAME

An open topped cardboard receptacle 80 containing a folded pile of connected bag elements 82 is placed vertically below infeed section 12 for feeding bags 82 into apparatus 10. No real initial alignment of the bags 82 in receptacle 80 is necessary, as will become evident hereinafter. Receptacle 80, for example, might comprise the shipping receptacle in which the bags are delivered, and with the top portion thereof cut away to permit feeding of the bags upwardly therefrom. Alternately the bags can be first removed from the shipping receptacle and fed simply from a folded pile. A second length of bags could then be taped together with the trailing edge of the first pile to permit continuation of the filling operation without requirement of roll changes or the like, such as where the bags are fed from roll stock.

A typical chain bag structure for use with apparatus 10 is shown in FIGS. 4 and 5. The bags are characterized by a continuous thickened section of profile 84 located such as along the top edge portion of the chain of bags 82; and are further characterized as including spreadable flaps 90 and 92 between which the bags can be successively filled. Such a bag structure is expediently formed, for example, by cross-sealing tubular or V-folded web material as indicated at spaced sealed areas or strips 94. Sealed areas 94 extend from bottom ends 96 of the bags to a region spaced from the top edges 98 and 100 thereof, leaving the before indicated freely spreadable flaps 90 and 92 at the top end of each bag.

A line of weakness 108 formed such as of perforations or slits 110 separated by small lands 112 extends along the mid-region of each seal area 94 preferably upwardly to the top edges 98 and 100 of the bags. Lines of weakness 108 desirably accommodate later separation of bags 82 without cutting them apart.

Profile 84 most desirably embodies a zipper type fastener means 85 extending continuously at a level con-

tiguous with the upper terminating ends 102 of sealed areas 94. Fastener 85 for exemplary purposes only, can comprise a continuous bead member 104 receivable such as in a continuous groove member 106. As may be noted, flaps 90 and 92 are associated with members 104 and 106, respectively, to provide tab means for repeatedly opening and reclosing the fastener.

OPERATION

To operate apparatus 10, the chain of bags 82 is fed upwardly around horizontal bar 14, and then downwardly underneath and around diagonal bar 16, thereby roughly aligning the chain vertically in apparatus 10. Cooperatively therewith, profile 84 is received and thereby continuously tracked in the groove 114 defined between idler rollers 18 and 20, as is best viewed in FIG. 3.

Bags 82 are then cooperatively received in belts 22 and 24 which grip between them flaps 90 and 92. The bags are forwarded, one bag width at a time, to spout means 52 via intermittently operating drive pulleys 28 and 30 and conveyor means 76. Accompanying forward movement of the chain, flaps 90 and 92 are plowed apart from each other by the generally torpedo shaped forward end of bracket means 54. The flaps thereafter pass snugly apart spout means 52 in firmly gripped relationship between walls 56 and 58 thereof and belts 22 and 24, respectively.

At the start of the filling cycle spout means 52 is in the collapsed or rest position as is shown in FIG. 1. To open the fastener, however, bar 46 is operated in the direction of arrows 126 such as by suitable air cylinder means or the like (not shown), assisted by movement of spring loaded idler pulleys 34 and 36, thereto, shorting spout means 52 lengthwise via "bowing" of walls 56 and 58 (see FIG. 2a). Walls 56 and 58, in turn, assisted by belts 22 and 24 employ flaps 90 and 92 as tab means for automatically opening fastener 85.

A product fill is then deposited into the opened bag underneath spout means 52, and the chain of bags forwarded by movement of belts 22 and 24 to repeat the filling cycle. Preferably simultaneously with such forward movement, bar 46 is reversely moved, thereby returning spout means 52 to the rest position. The fastener of the filled bag is then automatically closed such as by being squeezed back together in the groove defined between the second bar of idler rollers 72 and 74. If desired, a heat seal either spotted or continuous can additionally be employed to secure flaps 90 and 92 together to provide a tamper-proof closure (not shown). A like result is obtainable by trimming flaps 90 and 92 along a line adjacent fastener 85 since without the flaps there is no easy way to grip members 104 and 106 to cause them to open.

Understandably a tamper-proof seal, if used, need not be continuous since a substantially air tight closure can be obtained by use of fastener 85, and the purpose of the seal would be only to "tack" flaps 90 and 92 together. Therefore, contamination if it exists is not a serious problem since the sealing requirement is minimal. It may further be appreciated that the upper extent of flaps 90 and 92 are continuously shielded during filling by snug engagement with walls 56 and 58 such that the amount of contamination, if any, would be slight. Desirably, the region of film below such a tamper-proof seal might be perforated along a line 118, for example, as shown in FIG. 4, so that this portion of the film can

be conveniently removed from the bag to operate fastener 85.

It may be further noted that oftentimes the last filled bag element separates from the chain along a line of weakness 108 simply by dropping off the end of conveyor means 76. Alternately fast feeding off means or the like can be employed to accomplish this end as disclosed in U.S. Pat. No. 3,492,783.

Referring now to FIG. 6 a modified form of the invention is illustrated wherein a guide means 120 substituted for rollers 18 and 20, is illustrated as including continuous grooves 122 and 124 disposed to received thickened profiles of ridges 104a and 106a formed in bags 82a. Guide means 120 cooperates with belts 22a and 24a to permit indexing of the bags in a modified but generally similar manner to that contemplated hereinbefore. Ideally grooves 122 and 124 would communicate with similar grooves in the spout means (not shown) whereby ridges 104a and 106a would be unlikely to become contaminated when filling bag 82a with product. Even if contaminated, the maximum amount of film mass comprising ridges 104a and 106a permits maximum sealing temperatures and pressures to be applied such that the material would flow sufficiently to form a proper seal. Special note may be taken that ridges 104a and 106a are located in the uppermost extents flaps 90a and 92a, and therefore are spaced from terminating ends 102a of cross-seals 94a. Sealing along ridges 104a and 106a, therefore, will leave openings between the aforementioned ridges and terminating ends 102a. This would not be objectionable, however, in packaging citrus fruit, vegetables or the like, for example, since the bag is normally perforated anyway to provide for movement of air therethrough. Alternately, an interlocking fastener of a type such as described above can be substituted for ridges 104a and 106a to avoid the necessity of heat sealing.

As yet another alternative, ridges 104a and 106a might be located contiguous with the upper terminating ends of cross seals 94a so as to be positioned similarly to fastener members 104 and 106 of bags 82 (now shown). Such would provide an air-tight closure connecting at each end with cross-seals 94a, and further the mass of film involved would permit a more reliable achievement of a secure closure than when working with thinner film.

For further detail on interlocking fasteners for bags, reference can be had, for example, to U.S. Pat. Nos. 2,520,467, 2,558,367, 2,637,085, and 3,291,177. Such

bags can be constructed of usual packaging material such as films comprised of polyethylene, saran (a vinylidene chloride copolymer), polypropylene, and the like.

While certain representative embodiments and details have been shown for the purpose of illustrating the invention, it will be apparent to those skilled in the art that various changes and modifications can be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. In a method of producing filled receptacles, the steps comprising: incrementally advancing a flattened, generally vertically draped, flexible tube toward a filling area, while simultaneously controlling the position of the tube by tracking longitudinally extending zipper-like fastener members formed in the opposite walls of the tube, and which are mechanically occluded to join said walls together, the tube being regularly cross-sealed to define a series of bag elements releasably closed across their top end by said fastener members, and wherein said opposed walls extend above the fastener members, said tracking step assisting to generally precisely deliver the tube to a plowing element for plowing apart said walls at a height above said fastener members, cooperatively with said plowing step, individually gripping said walls to assist spreading the same sufficiently to release said fastener members to open said bag elements, filling said bag elements in the stop intervals accompanying the incremental advancement of the tube, and thereafter advancing the filled bag elements while pinching the fastener members to occlude the same, thereby closing the filled bag elements as they advance in a direction away from the filling area.

2. The method of claim 1 including the step of trimming said walls, after the bag element is filled to remove the portion thereof residing near to and above the fastener members, to form a tamper-proof closure for the bags.

3. The method of claim 1, wherein the method includes the step of holding said walls firmly against opposite side portions, respectively, of a filling spout, and moving at least one of said side portions outwardly to release said fastener elements for filling, and thereafter filling the bag elements through said spout.

4. The method of claim 3 wherein the occluded fastener members are released by the step of deformably moving at least one of the sides of the filling spout.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,744,211 Dated July 10, 1973
Inventor(s) Oliver R. Titchenal and William A. Armstrong

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 40, between "provide" and "sim-", the word --advantageous-- should be inserted.

Column 2, line 41, change "plicity" to --plicities--.

Column 2, line 68, after the word "which", insert a comma --,--.

Column 3, line 37, delete the word "and".

Column 4, line 19, delete "between them".

Column 4, line 34, change "thereto" to --thereby--.

Column 4, line 47, change "bar" to --pair--.

Column 4, line 49, change "secure" to --join--.

Column 4, line 55, delete "need" and insert --can--.

Column 4, line 56, delete "not".

Column 4, line 56, after the word "continuous", insert --or spotted as mentioned--.

Column 5, line 10, after the number "120" insert a comma --,--.

Column 5, line 27, change "extents" to --extent of--.

Column 5, line 33, change "anyway" to --in order--.

Signed and sealed this 20th day of August 1974.

(SEAL)
Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents