

July 30, 1968

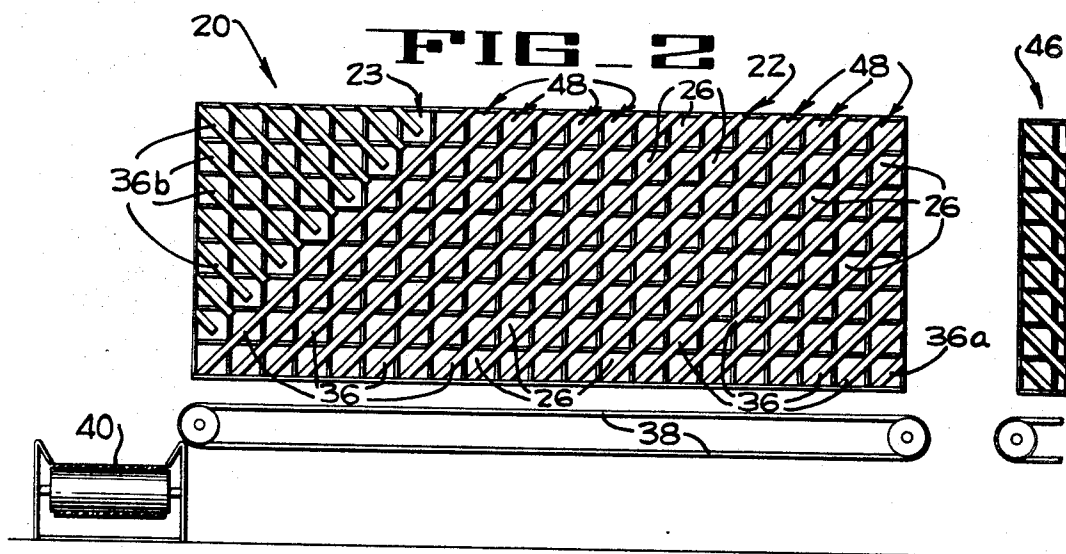
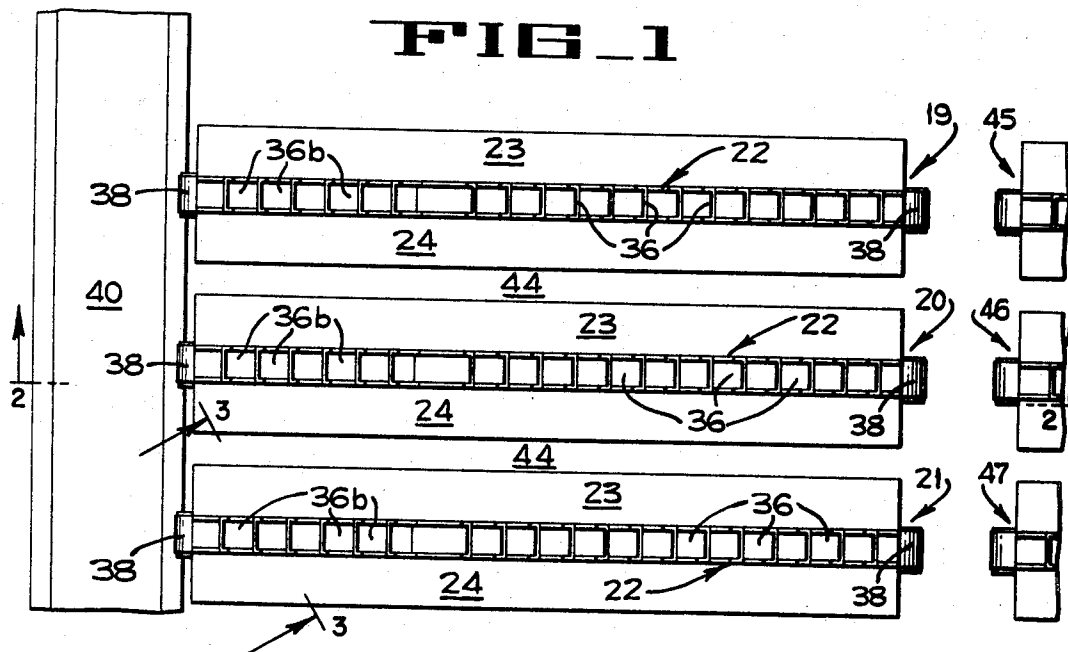
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METHOD OF AND APPARATUS FOR DISPENSING PACKAGED ARTICLES

Filed Aug. 5, 1963

4 Sheets-Sheet 1



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METHOD OF AND APPARATUS FOR DISPENSING PACKAGED ARTICLES

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4 Sheets-Sheet 2

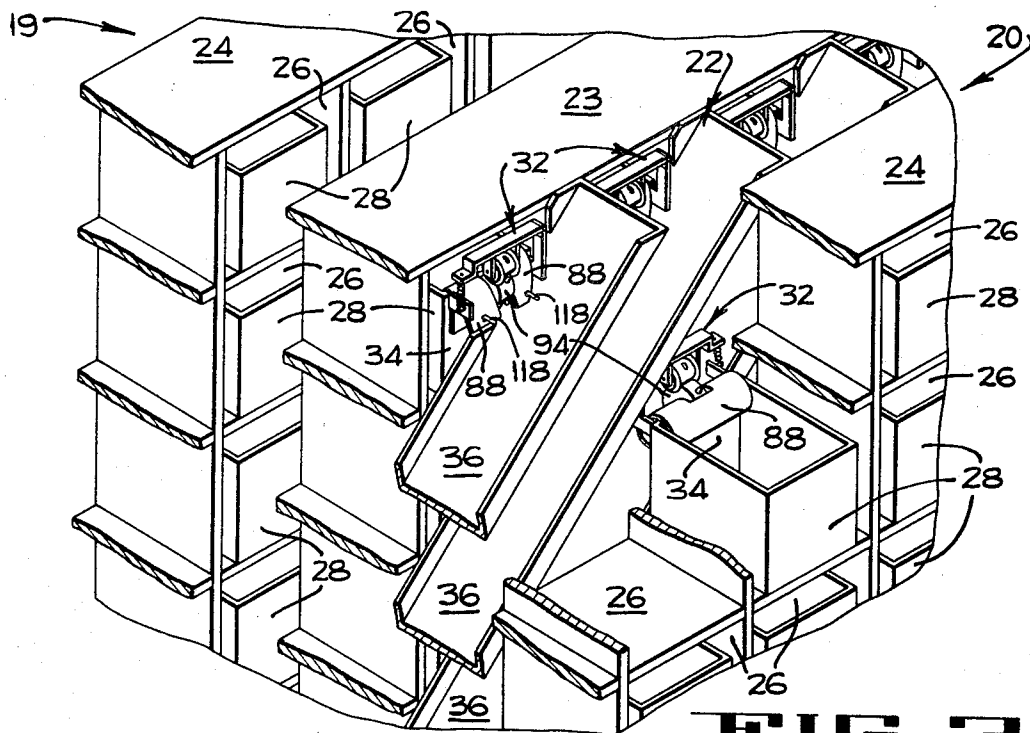


FIG. 3

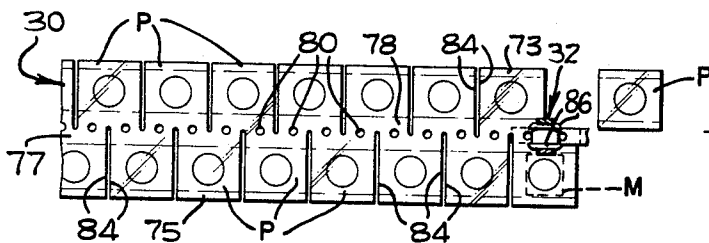


FIG. 5

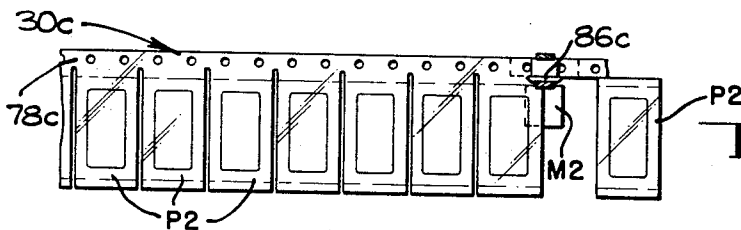


FIG. 6

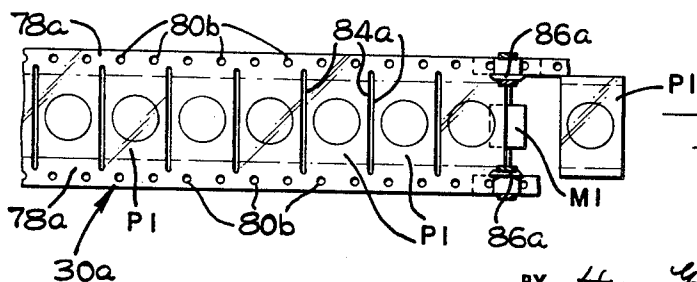


FIG. 7

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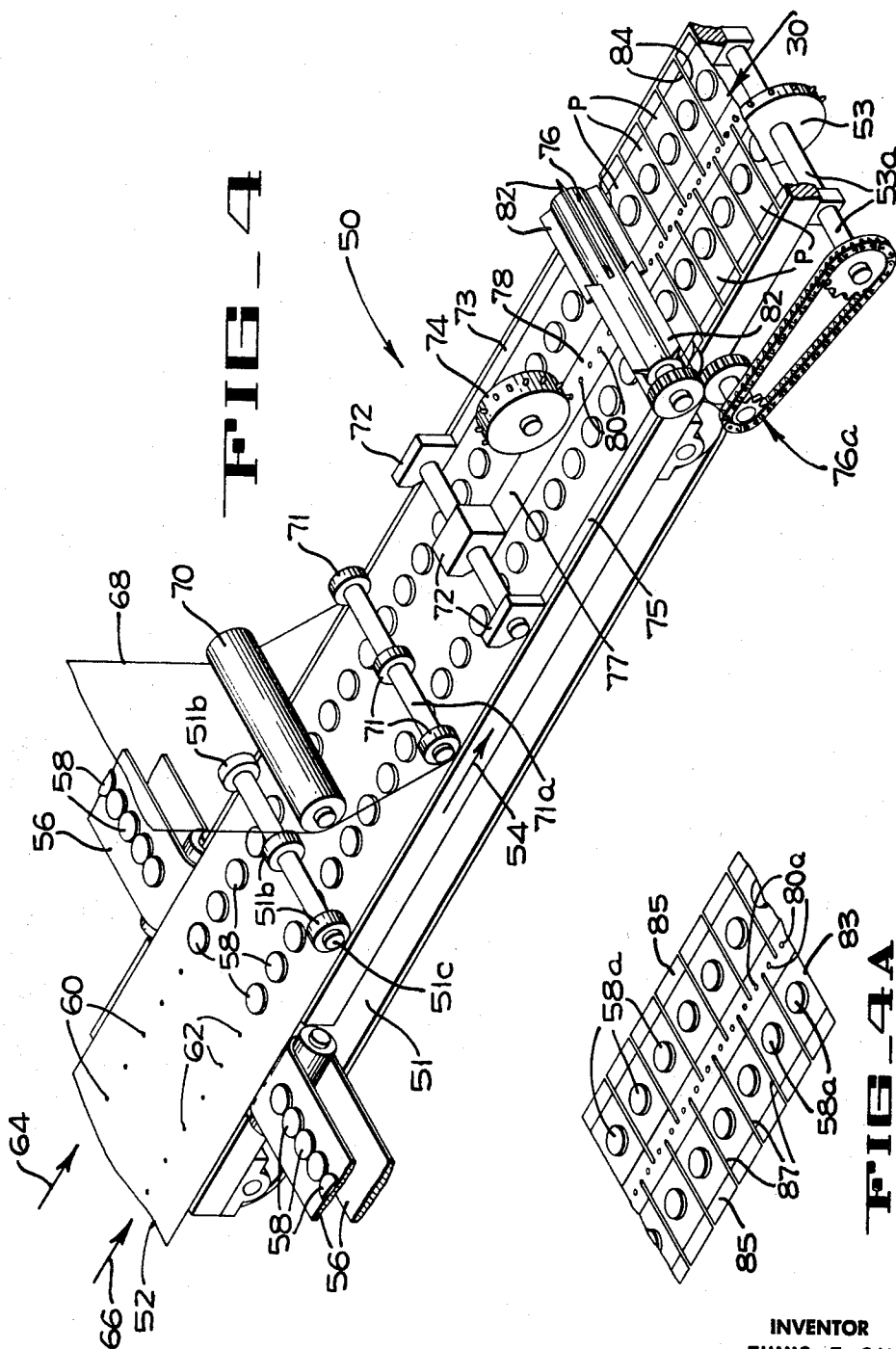
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4 Sheets-Sheet 3



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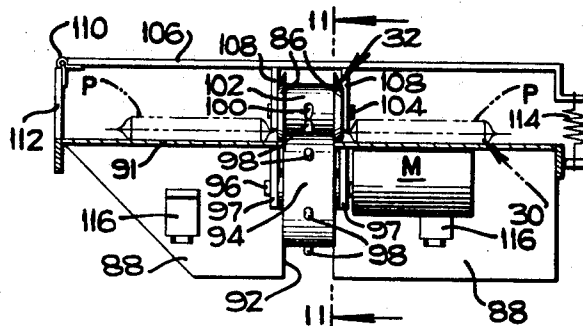
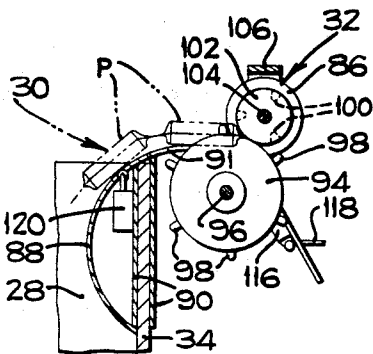
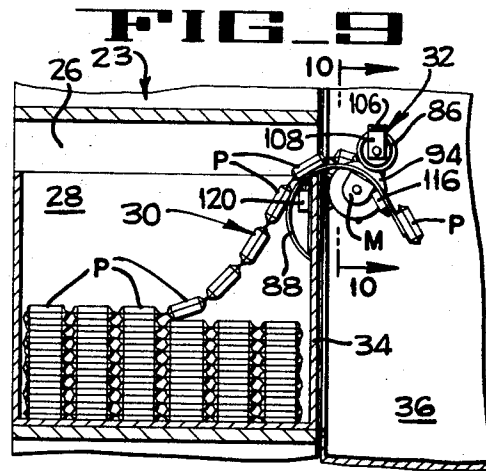
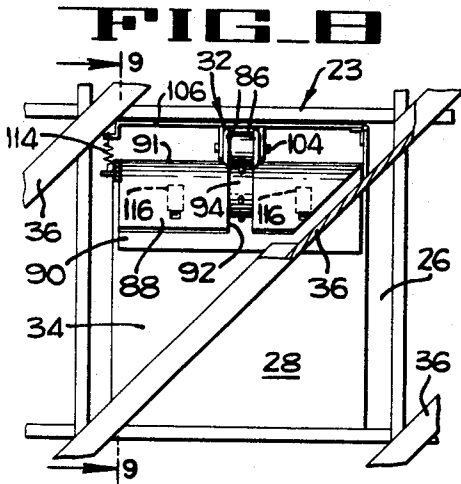
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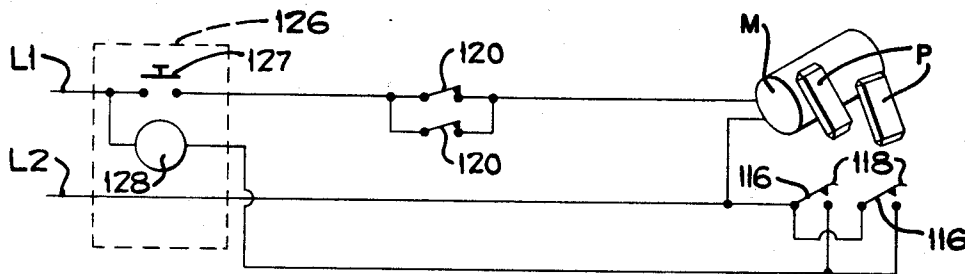
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FIG_11

FIG. 10



FIG_12

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METHOD OF AND APPARATUS FOR DISPENSING PACKAGED ARTICLES

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ABSTRACT OF THE DISCLOSURE

A method of packaging articles, a method of and apparatus for dispensing the packaged articles, and the package strip article. The package strip comprises individual packages connected to a common longitudinal carrier strip. The method of packaging includes sealing a series of articles between elongate webs, bonding the webs around the articles, and partially severing the webs transversely to leave at least one common unsevered longitudinal portion which forms the carrier strip. The dispensing method and apparatus includes moving the package strip endwise past a knife which severs the webs along a longitudinal line beside the carrier strip and intersects the transversely severed portions so that individual packages are separated from the carrier strip.

The present invention pertains to warehouse package dispensing equipment, and more particularly relates to an improved package and apparatus for handling the package.

In some warehousing operations where large numbers of different low-profit items are assembled into one shipping order, the cost of manually assembling the order will in many instances eliminate a large part of the profit. For example, in the electronic industry a large wholesale or retail supply company might stock a single type of item, such as a condenser or resistor, in hundreds of different combinations of manufacturers, sizes, types and electrical values. Many of these items have a relatively small profit margin, and because the required storage space must necessarily be quite extensive, manual order filling is a time consuming and expensive procedure more or less proportional in cost to the number of distinct articles in the order.

It has previously been proposed to fill orders by means of automatic dispensing, counting and assembling mechanisms arranged to handle articles of a specific size and shape rather than handling packages without regard to the size or shape of the articles in the packages. Many such mechanisms are commercially unacceptable because they are too expensive to purchase and maintain, because they are not adaptable to handle different sizes of products, or because extensive manual labor is required to load the dispensing equipment with the articles being handled.

In accordance with the packaging and dispensing method and apparatus of the present invention, storage bins and dispensing apparatus are designed to handle specific types of interconnected packages, rather than specific types of packaged articles, with one or more articles previously sealed in each package. The dispensing apparatus is responsive to either manual or remote automatic controls for severing predetermined numbers of the packages from the interconnected supply of packages and discharging the articles onto conveyors which assemble the packages at a central point; the apparatus for carrying out the foregoing operation is inexpensive, efficient and dependable, and requires a minimum of human attention.

One of the objects of the present invention is to provide a method of packaging articles in a continuous package

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strip so formed that endwise movement of the strip past fixed severing means will separate individual packages from the strip.

Another object of the invention is to provide an improved, automatic order filling apparatus.

Another object is to provide package dispensing means operable to automatically sever individual packages from a continuous package strip by cutting the strip parallel to the direction of movement of the package.

Another object is to provide package dispensing means operable to automatically sever separate packages from a continuous package strip without the usually required guillotine type of cutting means that necessitates precise control to prevent cutting through, instead of between, the packages.

Other objects and advantages of the present invention will become apparent from the following description and from the accompanying drawings, wherein:

FIGURE 1 is a fragmentary, schematic plan of a warehouse storage bin and article conveying arrangement.

FIGURE 2 is a schematic, vertical section taken along line 2—2 of FIGURE 1 and particularly illustrates an arrangement of gravity chutes for directing articles from a plurality of compartments in a storage bin onto package delivery conveyors. A package container and dispensing mechanism which is normally positioned in each bin compartment, has been omitted in order to clarify the drawing.

FIGURE 3 is a fragmentary schematic isometric taken looking in the direction of line 3—3 of FIG. 1 and showing the central upper portion of several storage bins and illustrating article dispensing mechanisms mounted on containers in certain storage bin compartments.

FIGURE 4 is a diagrammatic perspective illustrating a method of forming one embodiment of the continuous package strip by means of conventional package forming and sealing means.

FIGURE 4A is a perspective partially illustrating a method of hand forming a package strip similar to the package strip formed by the apparatus shown in FIGURE 4.

FIGURE 5 is a schematic plan of a composite strip of interconnected packages, and a cutter mechanism for severing individual packages from the strip.

FIGURES 6 and 7 are similar to FIGURE 5 and illustrate other embodiments of the composite package strip and associated cutter mechanism.

FIGURE 8 is a schematic front elevation, partly broken away, of one of the package dispensing mechanisms and its associated article container and gravity chute as shown in FIGURE 3.

FIGURE 9 is a schematic vertical section taken along line 9—9 of FIGURE 8.

FIGURE 10 is an enlarged schematic section taken along line 10—10 of FIGURE 9.

FIGURE 11 is a vertical section taken along line 11—11 of FIGURE 10, and is drawn at an enlarged scale.

FIGURE 12 is a diagram outlining a typical control system containing electrical and mechanical components for governing package dispensing and counting.

The warehousing system of the present invention includes a plurality of order-filling units 19, 20 and 21 (FIG. 1). Each order filling unit includes a gravity conveyor unit 22 mounted between two banks 23 and 24 of storage bins. The two banks of bins and the gravity conveyor unit are supported from the floor on suitable standards (not shown) and each bank of bins has a plurality of vertically and horizontally aligned rows of bin compartments 26. Each compartment 26 (FIGS. 3 and 9) has open front and rear ends and is adapted to support

an open top container 28 containing a continuous serpentine strip 30 (FIG. 9) of interconnected packages P. The leading end portion of the package strip 30 is engaged with a package dispensing mechanism 32 which is mounted on the front wall 34 of the container 28 and is actuated by remote electrical controls to advance the package strip, whereby the dispensing mechanism 32 severs a preselected number of individual packages P from the strip 30. After being separated from the strip, the packages drop onto a chute 36 (FIG. 2) of the gravity conveyor unit 22 which feeds the packages onto a belt conveyor 38 that discharges them onto a delivery conveyor 40. The delivery conveyor 40, plus other conveyors, as required, transfer the packages to a central delivery point (not shown) in the warehouse where the entire package order is assembled.

More specifically, the order filling units 19, 20 and 21 (FIG. 1) are arranged in rows perpendicular to the delivery conveyor 40, with access aisles 44 between adjacent units to provide access to the rear of the containers 28 in order to replenish the package strips 30. If warranted by the size of the particular warehouse installation, other rows of identical parallel units, such as the partially shown units 45, 46 and 47, can be used up to the limits of the available floor space. The units 45, 46 and 47 will, of course, be arranged to deliver packages to a conveyor system at their right hand end (FIG. 1).

Each container 28 (FIG. 3) is removably mounted in one of the storage bin compartments 26 and its front wall 34 is substantially coplanar with the corresponding vertical side of the front end of its associated bank of fins 23 or 24. The front wall 34 is adapted to rigidly support the packaged dispensing mechanism 32 that severs the individual packages P from the continuous package strip 30.

Each of the associated gravity chutes 36 which guide the individual packages P severed from the package strips 30 onto the belt conveyor 38 (FIG. 2) is inclined so as to be similarly oriented relative to all of the compartments 26 in a diagonally aligned row 48 of compartments. Two exceptions to this arrangement are that one of the lowermost compartments 26 is provided with an individual chute 36a, and that several of the upper compartments adjacent one end of the bins 22 and 24 are provided with chutes 36b that discharge onto the nearest chute 36. The chutes 36b, it will be seen, are oriented diagonally opposite to the chutes 36 in order to conserve space so that none of the chutes need extend beyond the end of their associated bank of bins.

The package strip 30 (FIG. 4) may be formed in any suitable type of packaging mechanism, such as a packaging mechanism 50 which includes a driven belt conveyor 51 for conveying a lower web 52 of heat-sealable plastic film, such as polyethylene, in the direction of the arrow 54. If necessary, driven rollers 51b on a shaft 51c may be used to press the web 52 against the conveyor belt 51 to aid in transporting the web. Near the other end of the packaging mechanism 50, a driven sprocket 53 on a shaft 53a assists in pulling the web 52. The speed relation between the sprocket 53 and the conveyor belt 51 is such that the web 52 is kept taut upstream of the sprocket. Near the upstream end of the web 52, each of two lateral conveyor belts 56 carries a row of articles 58 to be packaged to an operator who places the articles upon the web 52. To enable the operator to accurately position the articles, the web 52 may be previously imprinted with indicia indicating the proper locations for the articles, such as the marks 60 and 62. It will be noted the marks 60 are staggered relative to the marks 62 so that two spaced apart longitudinal rows 64 and 66 of articles will be thus formed upon the web, the articles in one row being longitudinally staggered and symmetrically arranged relative to the

articles in the other row. Mechanical article positioning means may be used in those instances when manual article placement is too slow or expensive.

An upper web 68 of heat-sealable polyethylene plastic film is trained under a guide roller 70, and under three guide rollers 71 on shaft 71a, and is forced downwardly onto the lower web 52 for movement therewith at the same linear speed. Both webs 52 and 68 extend under three transversely spaced heat-sealing shoes 72, under a perforator wheel or punch 74, and under a combination rotary cutter and sealing unit 76 which is driven in timed relation to the webs 52 and 68 by a chain, sprocket and gear drive unit 76a from the driven shaft 53a.

Two narrow longitudinal edge portions 73 and 75 of the upper and lower webs 52 and 68 are sealed together by the outermost heat-sealing shoes 72, and the intermediate shoe 72 performs a similar sealing operation at 77 along the longitudinal center line of the webs. This central sealed portion forms a continuous carrier strip 78 which is positively engaged by the package dispensing mechanism 32 to advance the package strip 30 through the dispensing mechanism 32 during a package dispensing operation. As will be explained presently, positive movement of the package strip 30 is preferably effected by means of a toothed drive wheel in the package dispensing mechanism 32 that drivingly engages apertures 80 which are formed along the carrier strip 78 by the perforator 74. The formation of the package strip 30 is completed by the cutter and sealing unit 76 which is provided with heated, radially projecting blades 82 that sever the webs 52 and 68 along transverse lines inward, as far as the centerline of the webs, and seal together the adjacent upper and lower web portions at 84 along each side of the severance lines. Thus formed, the package strip 30 comprises a plurality of individual packages P that extend laterally of the carrier strip 78 and are each connected to the carrier strip by an intermediate connecting portion of the webs 52 and 68.

The package strip can also be formed by hand in conjunction with a preformed lower web 83 (FIG. 4A) of desired length and a similar preformed upper web, not shown. The web 83 may be formed of plastic film, paper or metal foil, preferably coated along marginal edge portions at 85 and along narrow transverse areas adjacent each side of transverse slots 87 with a pressure sensitive adhesive or a quick setting glue. After positioning the articles 58a upon the web 83, the upper web is placed over web 83, with the sprocket holes 80a aligned. The webs are pressed together until the adhesive contacts all corresponding portions of the uncoated web. The completed package strip 30a is then ready for use.

It will be apparent that many similar package strips can be formed in various other sequences of steps than the sequence which has been described, and by equivalent steps and constructions. For example, the webs 52 and 68 might initially comprise one web folded transversely in half; the central carrier strip 78 might initially comprise a separate strip, which may be reinforced and later sealed to the package strips to interconnect the packages P. Whatever construction is used, the essential feature is that all package strips must be formed so that subsequent movement of a strip longitudinally past fixed cutting means in an associated package dispensing mechanism 32 will sever individual sealed packages P from the carrier strip 78. This concept is retained in the modified embodiments of the package strips illustrated in FIGURES 6 and 7, both of which will be later described.

It will be apparent, therefore, that the cutting means utilized in the package dispensing mechanism 32 completely separates the individual packages from the carrier strip 78 by a longitudinal severing action, in contrast to the transverse severing used in similar prior art dispensing devices. Accordingly, there is no possibility, when using a dispensing mechanism and a package strip constructed in accordance with the present invention, of

accidentally cutting through a package P or into the article it contains.

Cutting means which function in the above described manner to sever packages from the carrier strip 78 (FIG. 5) are provided by two discs 86 (FIGS. 3 and 8-11) which have sharpened peripheral edges and are part of the package dispensing mechanism 32. Before describing the package dispensing mechanism, it should be noted that when two discs are used they cut on opposite sides of the centerline defined by the holes 80, as shown in FIG. 5. It is also feasible to use only a single cutting disc 86 positioned so as to cut the package strip 30 along the centerline. While the packages P will then have one edge which is more or less marred because of the partial apertures 80, the advantage of using a single cutter is that there is no wasted packaging material because half of the carrier strip 78 remains on each package. The marring can be diminished, however, by providing narrow, elongate sprocket apertures in place of the apertures 80 for use with a sprocket having correspondingly wide teeth. The single linear cut through the narrow dimension of the elongate apertures thus causes the apertures to become nearly indistinguishable on the severed package.

The package dispensing mechanism 32 (FIGS. 3 and 8-11) is provided with an arcuate package strip guide plate 88 which forms both the frame of the mechanism and a guide over which the package strip 30 is trained. Two depending spaced plates 90 (FIGS. 8 and 11) are secured to the package strip guide 88. The plates 90 engage the corresponding surfaces of the front wall 34 of the container 28, and the width of the inner plate 90 is such that its ends lie close to the inner surfaces of the side walls of the container 28 in order to limit lateral movement of the package dispensing mechanism. Thus mounted, the dispensing mechanism 32 is rigidly attached to the container 28, except that it can be raised from the container wall 34 to rapidly dismount the same.

The upper wall 91 of package strip guide plate 88 (FIGS. 8 and 10) is provided with a slotted central portion 92 in which is mounted a drive sprocket 94 for engagement with the apertures 80 in the package strip 30. Sprocket 94 (FIG. 10) is secured to a shaft 96 which is journaled in tabs 97 depending from the upper wall 91 and is adapted to be intermittently rotated at a relatively slow speed by a gearhead type of electric motor M that is bolted to the wall 91. The sprocket 94 has teeth 98 which project through the apertures 80 (FIG. 5) in the package strip 30, and into sockets 100 (FIGS. 10 and 11) that are formed in a pressure roller 102. The roller 102 is mounted between the two cutter discs 86 on a shaft 104. The cutter discs 86 and the pressure roller 102 may be independently rotatable on the shaft 104.

An overhead bar 106 (FIG. 10) supports the shaft 104 by means of rigid depending arms 108, and is hinged at 110 to a fixed bracket 112. The other end of the bar 106 is urged downward by a tension spring 114 so that the pressure roller 102 firmly engages the sprocket 94. By raising the free end of the bar 106, the leading end of the package strip 30 (FIGS. 10 and 11) may be readily meshed with the sprocket teeth 98, and when the bar 106 is released, the spring 114 causes the cutter discs 86 to pierce the webs 52 and 68 (FIG. 4) in the sealed area of the carrier strip 78. Accordingly, when the motor M (FIG. 10) is energized to rotate the sprocket 94 and thus advance the package strip 30, the cutter disc 86 cause individual packages P to be severed from alternate sides of the package strip.

As is shown in FIGURE 10, each of the longitudinal rows of packages P is vertically aligned with an associated electrical counting switch 116. Each counting switch 116 is mounted on a forward downwardly inclined portion of the arcuate package guide plate 88 and is provided with an actuator arm 118 (FIGS. 3 and 11) that extends through an aperture in the forward por-

tion of the plate 88 and lies in the path of downward movement of the severed packages P. Because the two rows of packages P are in longitudinally staggered arrangement on the package strip so that packages are severed therefrom first from one side of the package strip and then from the other side, the switches 116 are alternately actuated. Thus, each switch will always supply an individual electrical pulse or signal that cannot interfere with the signal from the other switch.

From the foregoing, it will be seen that the package strip 30 provides an efficient packaging means for relatively lightweight articles. If heavier articles are to be handled, the package strip 30a (FIGURE 7) is particularly useful because it is provided with a carrier strip 78a and a row of sprocket engaging apertures 80b along each side edge so that the packages P1 are more completely supported and will lie substantially planar regardless of the weight of the articles they contain. It will be noted that the cutters 86a cut two selvage strips, one on each side of the package strips, from the perforate carrier strip areas 78a when the motor M1 advances the package strip during the dispensing operation in a manner similar to that already described in conjunction with FIGURE 5. Such movement of the package strip 30a causes the cutter discs 86a to sever the package strip along longitudinal lines intercepting the transverse slots at the seal areas 84a, whereby the individual packages P1 are released from the package strip.

If lightweight but relatively large articles are to be handled, the package strip 30c (FIG. 6) may be used, provided that the packaging material is sufficiently stiff to maintain the packages P2 substantially coplanar, and to prevent any marked degree of twisting of the packages P2 relative to the carrier strip 78c. When the motor M2 advances the package strip 30c during a dispensing operation, the cutter disc 86c forms only one selvage strip from the perforate carrier strip 78c. This particular package strip might therefore be preferred for packaging certain articles rather than the strip 30a (FIG. 7).

It is desirable to provide a sensing switch 120 (FIGS. 11 and 12) having an actuating arm for detecting each row of packages P at a point near where the uppermost package P (FIG. 11) in each row of packages is positioned. The switches 120 may be in an electrical circuit which will signal to the operator the absence of packages at this point and/or prevent energization of the motor M. It is also desirable to incorporate all of the conductors, not shown, of the package counting switches 116, of the package sensing switches 120, and of the motor M, into a single flexible cable which extends toward the rear of the storage bin along one side of the container 28. The cable may be connected, preferably by a multi-pin plug, to a trunk cable leading to a central point in the warehouse and terminating at a central control unit 126 (FIG. 12).

While various complex automatic controls might be used to govern the package dispensing operations, it is not important to the present invention to disclose an automatic control system in detail, since many such controls are within the design capabilities of persons skilled in the art.

In a simplified, non-automatic control system, the central control unit 126 is provided with control buttons 127, only one being shown, corresponding to each dispensing mechanism 32, and with an electrical impulse counting device 128 for tallying the packages P which are dispensed. The counter may be, for example, of the type manufactured by General Controls Company of the CE-40 series. The stock sensing switches 120 are wired in parallel, and are in series connection between the control button 127 and the motor M, the other terminals of the button and motor being respectively connected to the power input lines L1 and L2. Since the stock sensing switches 120 are normally closed when the dispensing mechanism is loaded, depressing the button 127 will en-

energize the motor M, whereby the packages P are severed from each row of the package strip as long as the button is depressed. During their discharge, each package P actuates the switch actuator 118 of its associated counting switch 116. The counting switches are wired in parallel, and with the electrical impulse counter 128 are in series connection between the power input lines L1 and L2 so that each discharged package P pulses the counter to tally the packages.

In the manner already described, the packages severed from the package strip 30 slide down the chutes 36, 36a and 36b (FIG. 2) onto the take-away conveyor 38, are discharged onto the delivery conveyor 40, and are thereafter assembled at some downstream assembly point to form the order originating at the central control unit 126.

From the foregoing description it will be seen that many features contribute to the efficiency and dependability of the order filling system. One important feature is the particular construction and arrangement of the package strip 30 which permits the individual packages to be severed therefrom when the package strip advances past fixed cutting means which sever the strip parallel to its direction of movement, thereby releasing individual packages P therefrom.

As previously indicated, however, many constructional details suggest obvious alternatives. It is evident, for example, that the perforate carrier strip 78 can be dispensed with if the sprocket 94 of the dispensing mechanism 32 is replaced by a wheel having sharpened pins to penetrate the upper and lower webs; that the cutter discs 86 can be driven, or can be replaced by heated Nichrome wire cutters and sealers. Likewise, a variety of package strip constructions other than those embodiments specifically disclosed and described will be apparent to those persons skilled in the art. Having thus described the invention, that which is believed to be new, and for which protection by Letters Patent is desired, is:

1. A method of dispensing separate packages from a package strip having a continuous longitudinal carrier strip portion to which one sealed edge portion of each package is connected, comprising the steps of pulling the carrier strip to longitudinally advance the package strip past a cutting station, and intercepting the endwise advancing package strip at said cutting station by severing the strip at a point free of said carrier strip and intercepting each of the adjacent sealed edge portions of the packages along a path substantially parallel to said carrier strip.

2. A method of dispensing packaged articles from a strip of individual sealed packages interconnected adjacent one common sealed end by a continuous longitudinal marginal carrier strip portion, comprising the steps of longitudinally advancing the package strip by pulling on the carrier strip to advance the package strip past a cutting station, and making a cut through the package strip at said cutting station to intercept said longitudinally advancing package strip at a point between the packages and said adjacent carrier strip so as to sever the common sealed ends of the packages from said longitudinal carrier strip.

3. In a method of dispensing separate packages from a package strip having a continuous longitudinal carrier strip portion and a plurality of individual packages secured in spaced relation to one longitudinal edge of said carrier strip, each package having a sealed zone extending a predetermined distance away from the connection of the package to said carrier strip, the steps of advancing said carrier strip longitudinally, and making a cut substantially parallel to said strip through the sealed zone of each successive package.

4. A method of packaging and dispensing articles comprising the steps of disposing articles in spaced apart relation between upper and lower webs, transversely sealing the upper and lower webs together between adjacent articles, longitudinally sealing the webs together

at each side of the articles to the outer edges of said webs, severing the transversely sealed portions of the webs between adjacent articles through one but only part of the other longitudinal sealed portions of the webs, said other longitudinal sealed portion thus forming a continuous carrier strip interconnecting a strip of article containing packages, and longitudinally severing said webs adjacent said carrier strip in a path intersecting said transversely severed portions so as to separate the packages from the carrier strip.

5. A method of packaging and dispensing articles comprising the steps of disposing articles in spaced apart relation between upper and lower webs, longitudinally sealing the webs together at each side of the articles, transversely sealing the webs together between adjacent articles, transversely severing the sealed portions of the webs between adjacent articles and through only one of said longitudinal sealed portions of the webs to form individual sealed packages having a common end interconnected by a carrier strip comprising the uncut longitudinal sealed portion, and longitudinally severing said carrier strip along a line interconnecting said transversely severed portions to separate the article-containing packages.

6. A strip of interconnected packages comprising elongate upper and lower webs enclosing a spaced series of articles, at least one carrier strip formed of coextensive areas of both webs along common longitudinal portions thereof, the remaining portions of said webs being bonded together completely around said articles and transversely severed intermediate adjacent articles through said bonded portions and into but not through the longitudinal carrier strip portions of the webs, and means defining a series of apertures along said carrier strip to provide means for positively engaging said strip.

7. A series of interconnected packages comprising upper and lower webs enclosing a longitudinal row of spaced articles, said webs being transversely severed and sealed intermediate adjacent articles inwardly from one longitudinal edge to a point adjacent the opposite edge, said opposite longitudinal edge portion having a continuous longitudinal seal between said upper and lower webs and extending inwardly from the outer limit of said edge to a point beyond the adjacent ends of said transversely severed and sealed area.

8. A series of interconnected packages comprising upper and lower elongate webs enclosing a longitudinal row of articles, said webs being transversely severed and sealed intermediate adjacent articles inwardly from one common longitudinal edge to a point adjacent the common opposite edge, said opposite longitudinal edge portion having a continuous longitudinal seal between said upper and lower webs inwardly from the outer limit of said edge to a point beyond the adjacent ends of said transversely severed and sealed areas to form a continuous longitudinal carrier strip interconnecting the packages, and means defining a series of apertures along said carrier strip to provide means for positively engaging said strip.

9. A series of interconnected packages comprising upper and lower webs enclosing a longitudinal row of articles, said webs being transversely severed and sealed intermediate the side edges of the webs between adjacent articles to bond together said upper and lower webs, each of said side edges of said webs having a continuous seal between said upper and lower webs and extending inwardly beyond said severed and sealed areas, and means defining a series of apertures along said side edges.

10. A series of interconnected packages comprising upper and lower webs enclosing a longitudinal row of articles, said webs being transversely severed and sealed intermediate their side edges between adjacent articles to bond together said upper and lower webs, each of said side edge portions having a continuous seal between

said upper and lower webs inwardly beyond said severed and sealed areas to form a continuous longitudinal carrier strip at each side of the articles, and means defining a series of apertures along each of said side edge portions to provide means for positively engaging said carrier strips for endwise movement thereof.

11. A series of interconnected packages comprising elongate upper and lower webs containing a longitudinal row of uniformly spaced articles along each side of the webs, said webs being transversely severed and sealed to bond together said upper and lower webs inwardly to the longitudinal centerline thereof between adjacent articles in each of said rows, said upper and lower webs being sealed together along a narrow elongate area substantially symmetrical with respect to the longitudinal centerline of the webs and extending outwardly from said centerline beyond the inner limits of said transversely severed and sealed areas.

12. A series of interconnected packages comprising elongate upper and lower webs containing a longitudinal row of uniformly spaced articles along each side of the webs, said webs being transversely severed and sealed to bond together said upper and lower webs inwardly to the longitudinal centerline thereof between adjacent articles in each of said rows, said upper and lower webs being longitudinally sealed together along a narrow elongate area substantially symmetrical with respect to the longitudinal centerline of the webs to form a carrier strip extending outwardly from said centerline beyond the inner limits of said transversely severed and sealed areas, and means defining a series of apertures along said centerline seal area providing means for positively engaging said carrier strip.

13. A series of interconnected packages comprising elongate upper and lower webs containing a longitudinal row of uniformly spaced articles along each side of the webs, one row of articles being in longitudinally staggered relation to the other row of articles, said webs being transversely severed and sealed to bond together said upper and lower webs inwardly to the longitudinal centerline thereof between adjacent articles in each of said rows, said upper and lower webs being sealed to-

gether along a narrow elongate area substantially symmetrical with respect to the longitudinal centerline of the webs to form a carrier strip extending outwardly from said centerline beyond the inner limits of said transversely severed and sealed areas.

14. A series of interconnected packages comprising elongate upper and lower webs containing a longitudinal row of uniformly spaced articles along each side of the webs, one row of articles being in longitudinally staggered relation to the other row of articles, said webs being transversely severed and sealed to bond together said upper and lower webs inwardly to the longitudinal centerline thereof between adjacent articles in each of said rows, said upper and lower webs being sealed together along a narrow elongate area substantially symmetrical with respect to the longitudinal centerline of the webs to form a carrier strip extending outwardly from said centerline beyond the inner limits of said transversely severed and sealed areas, and means defining a series of apertures along said centerline seal area providing means for positively engaging said carrier strip.

References Cited

UNITED STATES PATENTS

Re. 20,517	9/1937	Adler	206—56
2,281,707	5/1942	Mott	206—56
3,060,653	10/1962	Flax	53—28
3,088,256	5/1963	Brown	53—28
1,704,808	3/1929	Pater	83—648
2,275,476	3/1942	Sherman et al.	83—648
943,652	12/1909	Coe et al.	206—56
1,250,016	12/1917	Richards	206—56
1,637,891	8/1927	Bates	53—28 X
2,008,659	7/1935	Salfisberg	206—56
2,146,308	2/1939	Maxfield	53—28
3,039,246	6/1962	David	206—56
2,180,966	11/1939	Salfisberg	53—28
2,657,144	10/1953	Batchlet	206—56
2,338,922	1/1944	Fleming	229—69

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