FILLING HEAD FOR STRIP STOCK PACKAGING MACHINE

Filed Feb. 14, 1968

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FILLING HEAD FOR STRIP STOCK PACKAGING MACHINE

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Int. Cl. B65b 1/02

U.S. Cl. 53—183 12 Claims

ABSTRACT OF THE DISCLOSURE

A continuous packaging apparatus including a sealer for forming spaced seals along a length of film relative to print marks thereon; a motor drive for feeding the film to the sealer; a filling wheel including a filling plate mounted on bearings on an inclined axis relative to the vertical axis of a lower supporting wheel of the filling wheel; and filling spouts on the filling wheel such that when the top plate and the lower filling wheel are rotated, the filling spouts are projected into the spaces between the lands on the lower wheel and into the pockets positioned on the vertical inclined lands on the lower wheel to enable the pockets to be readily filled.

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of our co-pending application Ser. No. 484,481, entitled "Manufacture of Sealed Packages From Strip Stock" filed Sept. 1, 1965, now U.S. Pat. No. 3,453,799, issued on July 8, 1969.

BACKGROUND OF THE INVENTION

This invention relates to a method and apparatus for continuously forming a series of filled packages of variable width from a continuous length of film or flexible material such as a paper, cloth or metal strip, transparent or opaque. The material may be heavy or light as desired. The film material may be plastic coated where the pockets are to be formed in a heat sealing operation.

It has been found that where heavier foil materials are to be used in the formation of packages, there is difficulty in utilizing conventional continuous packaging machines due to the greater rigidity of the packaging material. It has been found to be quite difficult and less efficient to fill packages of a heavier material in a manner similar to that used for lighter packaging materials.

SUMMARY OF THE INVENTION

We have provided a complete packaging method and apparatus utilizing a novel filling wheel which may be utilized with heavier gauge foils and paper packaging materials. Accordingly, it is an object of this invention to provide a novel filling wheel cooperative with other mechanisms to continuously package articles in a packaging film.

It is one of the objects of the present invention to provide a continuous packaging method and apparatus for the high-speed manufacture of filled packages from continuous film material free of packaging defects.

Another object of the present invention is to provide a new and improved filling wheel for controlling the filling of pockets formed in the film.

A further object of the present invention is to provide a new and improved filling wheel having adjustable lands to adapt the filling wheel and the packaging machine to different width packages without changing the filling wheel.

Yet another object of the present invention is to provide a method and apparatus for the high-speed manufacture of filled packages from heavy gauge film material free of packaging defects.

A still further object of the present invention is to provide a novel filling wheel having a pair of rotating discs to move filling spouts into and out of engagement with the packaging material having pockets formed therein.

Many other advantages, features and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

On the drawings:

FIG. 1 is a top plan view of a packaging machine constructed in accordance with the principles of the present invention;

FIG. 2 is a sectional view of the filler wheel taken along the line II—II of FIG. 1;

FIG. 3 is a bottom fragmentary view of the upper filler wheel taken along the line III—III of FIG. 2;

FIG. 4 is a top fragmentary view of the lower filler wheel illustrating the vacuum passages;

FIG. 5 is an enlarged fragmentary sectional view similar to that shown in FIG. 2 of a filling station; and

FIG. 6 is a fragmentary side view of the packages associated with the filling spouts.

As shown on the drawings:

The principles of this invention are particularly useful when embodied in a packaging machine such as illustrated in FIG. 1, generally indicated by the numeral 10.

The packaging machine 10 produces a filled package 12 having a left and a right seal 14, 16 respectively, at the rate of hundreds per minute. The packages 12 may be produced from a continuous film of material or from several continuous films of material as desired. Some packaging materials can be more readily folded than other films, and machines of the type shown in the drawings can be readily used for producing filled packages of this type.

Particularly in the use of heavier foil materials which are harder to handle due to their greater rigidity, special filling apparatus is required. Such heavy foils are so stiff that they will not blow open by the conventional methods useful for lighter packaging materials.

The machine 10 has a base 18 supporting various components including a roll stand 20 which supports the roll strip or continuous film of packaging material 22. The roll of film 22 is supported on a shaft 24 in such a manner that when the film 23 is unrolled it is disposed generally in a horizontal plane.

The film 23 may be of any suitable type and can be coated on at least one side with a sealable material such as plastic or other suitable adhesive. The film of packaging material 23 can be supplied in printed form or can be printed while on the machine 10 by providing a suitable printing device 26. The strip 23, if not printed, can be printed by moving the same through the printing device 26.

A paper plow 27 is supported on the frame 18 forwardly of the printing device 26. The paper plow 27 folds the film 23 such that the fold is disposed at the bottom of the film 23 with the film assuming generally V-shape, FIG. 4.

In order to further prepare the film 23 to form filled packages, a pair of guide rollers 29, 30 is disposed on the downstream side of the plow 27 and the folded film 23 is guided therebetween to a vertical sealer 31. The film 23 is adapted to be pulled and moved through an arc as the vertical sealer is driven. The vertical sealer 31 has a series
of vertically extending circumferentially spaced heated lands 32 which are provided to form longitudinally spaced vertically extending heat seals 14, 16 in the film 23, FIG. 1.

The parts heretofore described comprise means for supplying, guiding and longitudinally moving the strip 23 having longitudinally spaced pockets 33. After leaving the vertical sealer 31, the film 23 is moved past the rollers 34 and 35. The roller 35 is driven through a sprocket drive in relation with a timing filling wheel station, generally indicated at 37. The station 37 is constructed in accordance with features of the present invention, for filling each pocket 33 with a pre-selected quantity of any suitable material to be packaged.

The pockets 33 are filled as the film 23 moves about the filling wheel 37 and contain the pre-selected amount of material by the time they reach the take-off roller 40. After leaving the filling wheel 37, the film 23 is moved through a top sealer 44 which provides a horizontal heat seal to close each pocket 33 and capacte the product therein.

The generally vertically oriented film 23 is then passed through a second capstan drive 46 and is turned under a horizontal roller 48 so as to again move in a generally horizontal plane into a combination indexer and slicer 50. From this mechanism 50, individual sealed packages 12 fall to and are carried away by an endless conveyor belt 54.

A more detailed discussion of some of the parts of the machine 10 which do not, in themselves, constitute the present invention, may be found in U.S. patent application Ser. No. 484,481, filed Sept. 1, 1965 by Charles E. Cloud and Richard F. Purvinis, entitled "Manufacture of Sealed Packages From Strip Stock," now Pat. No. 3,453,799, issued on July 8, 1969, and in U.S. Pat. No. 3,334,576.

Disposed above the filling wheel 37 is a product hopper 60 mounted to a support 62 above the base 18. The product to be packaged is placed in the funnel 60 and falls through the aperture therein to the top 63 of the filling wheel 37. Within the filling wheel 37 are a plurality of product funnels 64 which convey the product to the individual packages. The product is concentrated at the outer radius of the filling wheel top 63 by a product wiper 68.

As the film of packaging material 23 advances to the filler wheel the sides of the film 23 are separated by air supplied from an air jet 72.

The filling wheel 37 is rotatably mounted on the base 18 on a pair of shafts 100, 102. The upper shaft 102 is joined to a support 104 above the filling wheel 37. The filling wheel 37 includes a vacuum transfer base disc 106 and an inclined filler disc 108 disposed above the vacuum disc 106. The vacuum disc 106 is caused to rotate with the shaft 100 by a key 110. Around the periphery of the vacuum disc 106 are a plurality of vacuum bellows 112 connected to a corresponding plurality of vacuum passages 114 which connect the vacuum bellows 112 to a source of vacuum (not shown).

On either side of the vacuum bellows 112 are vacuum lands 116 secured to the vacuum disc 106 by a pair of adjustment screws 118 and 119. The adjustment screw 118 is formed in an oval slot 120 which allows the land 116 to be angularly adjusted with respect to the vacuum disc 106.

The vacuum disc or structure 106 is connected to the filler disc or structure 108 by a central hub or drive gear 122 disposed about the shaft 100. The drive gear 122 is fixedly connected to structure 106 by bolts (not shown). The drive gear 122 includes a ball bearing unit 124 engaging the bottom portion of an upper shaft 102 to allow structure 108 to rotate about the fixed shaft 102. The central hub member 122 has vertical channels 126 formed therein which provide a guide means for vertical guide rollers 130. The vertical guide rollers 130 are secured to and form a part of a driven gear 132 that is attached to the bottom of the top disc 108 about the upper shaft 102.

The top filler disc 108 is supported about the upper shaft 102 by a pair of ball bearing ring sets 134. The top filler disc 108 has a radial wall 136 which forms a retaining area for the product. In adjacency to the radial wall 136 are the product funnels 64 which connect to the filler bellows 138.

The driven gear 132 of the top disc 108 is formed with an enlarged aperture 142 and is connected to the top disc 108 by a plurality of adjustment screws 144 secured in radial channels 146 to allow adjustment of the top disc 108 with respect to the base disc 106, FIG. 3.

As the film material 23 is unwound from the film supply roll 22 it is fed through the printing station 26 to the paper plow 27 and vertical sealer 31. The film material 23 is then prepared for receiving a product from the filling wheel 37.

The walls of the pockets 33, formed in the film material 23 are separated initially by the air separator 72 and maintained separated by the vacuum bellows 112, FIG. 5. The top disc 108 of the filler wheel 137 is inclined on the shaft 102 relative to the vacuum disc 106. The two discs 106 and 108 rotate together due to the connection provided by the vertical guide channels 126 and the guide rollers 130. The top disc 108 cooperates with the vacuum disc 106 to move the spouts 138 into and out of the pockets 33.

The movement of the filler spouts 138 into and out of the pockets 33 provides for greater efficiency and certainty of the product being inserted in the pocket 33. In lieu of a film type pocket or pouch, cans or boxes or any other receptacle may be used in which the spout of the filler wheel is caused to be inserted in the package being filled.

The lands 116 are adjustable with respect to the vacuum disc 106 by means of the adjustment screws 118 and the cooperating channel 120. Such inclined lands 116 in cooperation with the vacuum bellows 112 allow for the use of a wide or narrow web of pouch material 23. If a narrow web is used, then the lands 116 are adjusted outwardly. If a wide web is used, then the lands 116 would be adjusted inwardly toward the center of the vacuum disc 106. Thus different widths packaging materials may be run on the filling wheel 37 without the necessity of changing the vacuum disc 106. The filling wheel 37 is particularly adapted to be used with foil or heavy paper or a stiff packaging material that is resistant to separation at the filling operation. The combination of a separating means includes an air jet 72 and vacuum bellows 112 whereby the pockets 33 may be separated for filling.

In the practice of the method of filling a series of pockets 33 in a continuous film 23 includes rotating the inclined top plate 108 with the vacuum disc 106 on the two sets of ball bearings 134, 136. The top disc 108 is inclined relative to the vertical axis of the vacuum disc 106. The top disc 108 and the vacuum disc 106 are rotated in such a manner that the filling spouts 138 are project into the spaces between the lands 116 on the vacuum disc 106 and into pockets or pouches 33 positioned on the vertical inclined lands 116 on the filling wheel 37 to enable the pockets 33 to be readily filled.

The relation of the top disc 108 and the vacuum disc 106 is such that as they are rotated the filling spouts 138 are progressively introduced into the pockets 33 along the length of the strip 23. The spouts 138 remain in the pockets 33 until the pockets are filled whereas the spouts 138 are lifted from the pockets as the filled pockets are then moved to the longitudinal sealing station 44.

As the filling wheel 37 is rotated, the product to be packaged is deposited in the funnel 60 and allowed to spread on the filling wheel top 63 within the radial wall 136. The product wiper 68 spreads the product into the product funnels 64 as the spouts 138 are at a lowest position, engaged in the pockets 33. The spouts 138 are designed to extend an equal distance below the top disc 108.

It is also contemplated that by the above inclined top
The method of filling a series of pockets 33 on a continuous film 23 includes the steps of moving the film 23 over a feed roller in a direction toward the plurality of spouts 138 on the filling wheel 37, rotating the pair of inclined discs 106, 108 together, moving the spouts 138 into the pockets 33 as the upper disc 108 rotates, whereby the pockets 33 are filled with a material to be packaged.

Although minor modifications might be suggested by those versed in the art, it should be understood that we wish to embody within the scope of the patent warranted hereon, all such modifications as reasonably and properly come within the scope of our contribution to the art.

We claim as our invention:

1. A continuous packaging apparatus including:
   seal means for forming spaced transverse seals along a length of film between print marks thereon to form pockets;
   feed means for feeding the length of film to said sealor;
   filling wheel means to fill the pockets in the sealed film with a product;
   said filling comprising a pair of relatively inclined structures, the lowermost having a series of lands and valleys about its perimeter and the uppermost structure having a series of spouts oriented relative to the valleys so that the relatively inclined structures are rotated the spouts are moved into and out of the valleys during a pocket filling period; and
   means to seal the open ends of the thus filled pouches to form packages.

2. A continuous packaging apparatus as recited in claim 1, wherein said lands on said lowermost filling means are adjustable.

3. A continuous packaging apparatus as recited in claim 1, wherein said filling means includes vacuum bellows and air jet means to separate the pockets for filling.

4. A method of continuously forming sealed packages comprising:
   forming one or more lengths of strip stock into a series of upwardly opening pockets disposed along the length of the stock and separated by upright sealed areas;
   engaging the formed strip stock against a filling station having raised and spaced lands formed thereon with the sealed areas engaging the lands and with the pockets extending across depressed areas between adjacent ones of the lands;
   applying a vacuum to one side of the pockets in the depressed areas for pulling the sides of the pockets apart to facilitate filling the pockets and to retain the strip stock in engagement with the filling station;
   filling the pockets with material to be packaged while continuing to apply the vacuum;
   said filling step including the steps of inserting a spout into the opened pockets and directing material to be packaged through the spout into the opened pockets and releasing the vacuum to permit disengagement of the strip stock from the filling station.

5. An apparatus for packaging comprising:
   means supplying one or more strips of packaging material;
   means forming spaced pockets along a length of the strip material and leaving upper ends of the pockets open;
   a filling station having spaced lands and valleys along which the formed strip is guided and moved;
   said filling station having a first rotating member with said spaced lands disposed about the periphery thereof and circumferentially spaced therearound;
   a vertically disposed shaft having said first mem-

6. An apparatus for packaging as defined in claim 5 and further characterized by:
   said filler disc having a substantially planar upper surface;
   material feeding means fixedly disposed above said filler disc upper surface and depositing a stream of material to be packaged onto said disc as the latter rotates with said first member;
   each of said plurality of spouts having a throughbore opening at said upper planar surface of said filler disc; and
   a fixed wiper blade engaging said filler disc upper surface for directing the stream of material into said spout throughbores whenever said spouts are inserted into one of the opened pockets for filling the pockets.

7. An apparatus for packaging comprising:
   means supplying one or more strips of packaging material;
   means forming spaced pockets along a length of the strip material and leaving upper ends of the pockets open;
   a filling station having spaced lands and valleys along which the formed strip is guided and moved;
   said filling station including a disc member disposed for rotation about a substantially vertically extending axis;
   a plurality of circumferentially spaced, radially extending plate members disposed about the periphery of said disc member and forming said spaced lands with said valleys defined between adjacent ones of said plate members; and
   releasable fastening means mounting said plate members on said disc and being releasable to enable selective movement of said plate members radially of said disc member to adapt said filling station for receiving differently sized pockets;
   means disposed about a periphery of the filling station in said valleys for opening the pockets; and
   means for funneling material into the opened pockets.

8. An apparatus for packaging as defined in claim 7 and further characterized by:
   said lands being inclined relative to the axis of rotation of said disc member with a lower end of each of said lands being radially spaced outwardly of an upper end thereof.

9. A filling station for a pocket forming and filling apparatus comprising:
   a first disc member disposed for rotation about a substantially vertically extending axis;
   means forming a plurality of circumferentially spaced lands disposed about a periphery of said disc member and defining valleys between adjacent ones of said lands;
   a filler disc disposed above said first disc member and mounted for rotation about an axis inclined relative to the axis of rotation of said first disc,
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said filler disc having a substantially planar upper surface formed thereon;
a plurality of spouts disposed around a peripheral edge portion of said filler disc and depending therefrom,
one said spout being provided for each said valley on said first disc member;
coupling means interconnecting said first disc member and said inclined filler disc so that rotation of said first disc member rotates said filler disc to sequentially move said spouts downwardly into successive ones of said valleys;
material feeding means fixedly disposed above said filler disc and depositing a stream of material sequentially into said spouts as the latter are moved into one of the valleys,
whereby a strip of packaging material having spaced pockets formed therealong and separated by upright closed areas may be engaged against said lands with the pockets extending across said valleys so that rotation of said first disc member moves the strip to a position wherein said spouts sequentially move into successive ones of the pockets for filling the pockets with the material to be packaged.

10. A filling station for a pocket forming and filling apparatus comprising:
a first disc member disposed for rotation about a substantially vertically extending axis;
a plurality of circumferentially spaced, radially extending plate members disposed about a periphery of said disc member and having radially outwardly projecting lands formed thereon,
said plate members separating valleys defined between adjacent ones of said plate members;
releasable fastening means mounting said plate members on said disc members and being releasable to enable selective movement of said plate members radially of said disc member to adapt said filling station for receiving differently sized pockets.

11. An apparatus for packaging as defined in claim 10 and further characterized by:
said lands being inclined relative to the axis of rotation of said disc member with a lower end of each of said lands being radially spaced outwardly of an upper end thereof.

12. A filling station for a pocket forming and filling apparatus comprising:
a first disc member disposed for rotation about a substantially vertically extending axis;
means forming a plurality of circumferentially spaced lands disposed around a periphery of said disc member and defining valleys between adjacent ones of said lands;
a filler disc disposed above said first disc member and mounted for rotation about an axis inclined relative to the axis of rotation of said first disc,
said filler disc having a substantially planar upper surface formed thereon;
a plurality of spouts disposed around a peripheral edge portion of said filler disc and depending therefrom,
one said spout being provided for each said valley on said first disc member;
coupling means interconnecting said first disc member and said inclined filler disc so that rotation of said first disc member rotates said filler disc to sequentially move said spouts downwardly into successive ones of said valleys;
whereby a strip of packaging material having spaced pockets formed therealong and separated by upright closed areas may be engaged against said lands with the pockets extending across said valleys so that rotation of said first disc member moves the strip to a position wherein said spouts sequentially move into successive ones of the pockets for filling the pockets with the material to be packaged,
each of said spouts depending from said filler disc a distance so that a lowermost outlet end of each of said spouts is inserted into the pockets below an uppermost end portion of the pocket sidewalls which form an upper seal for the pockets, thereby to prevent depositing material on the area to be sealed.

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U.S. Cl. X.R.

53—266; 141—144, 248