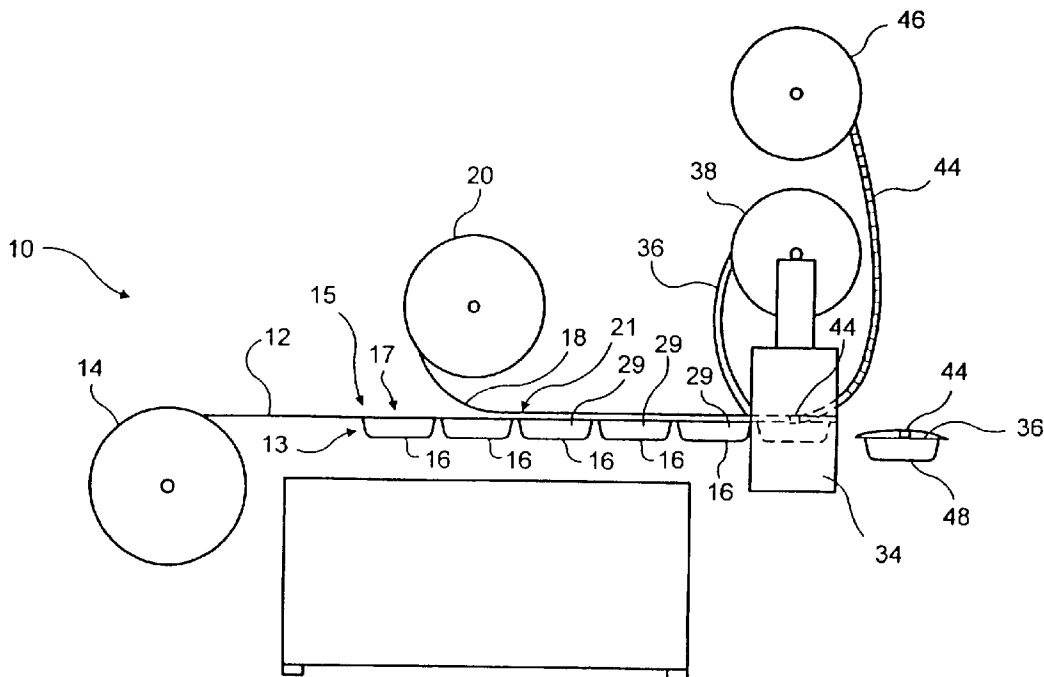


(43) **Pub. Date:** **Dec. 12, 2002**



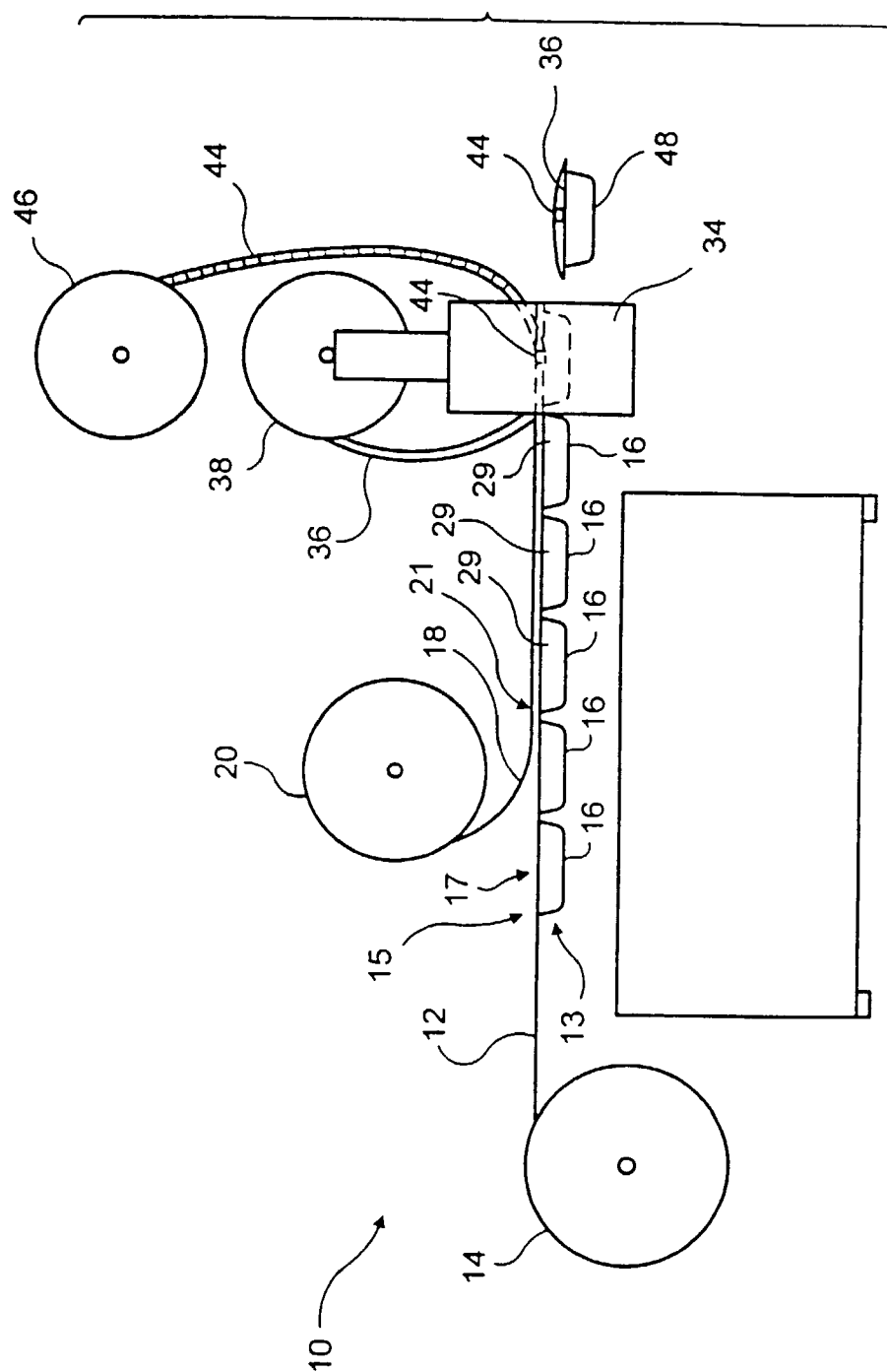


FIG. 1

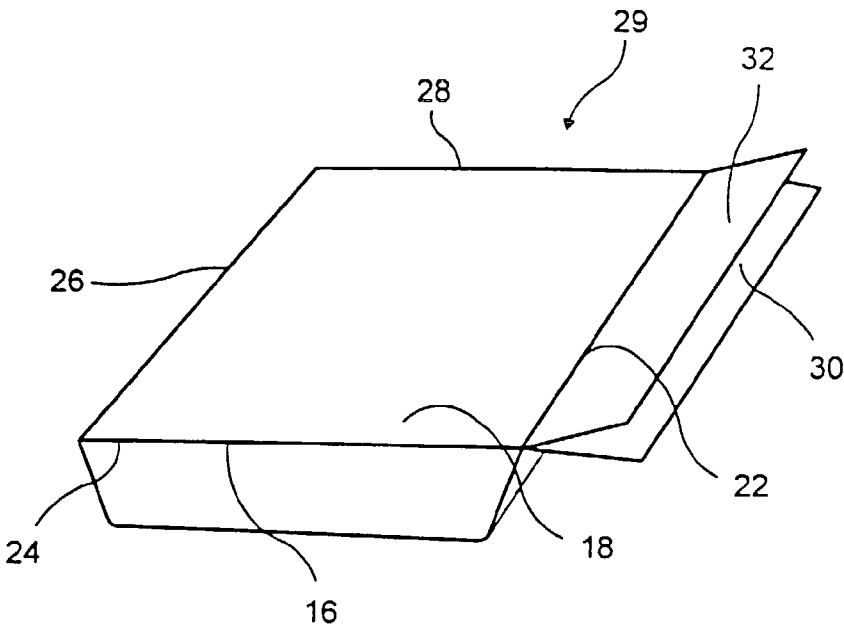


FIG. 2

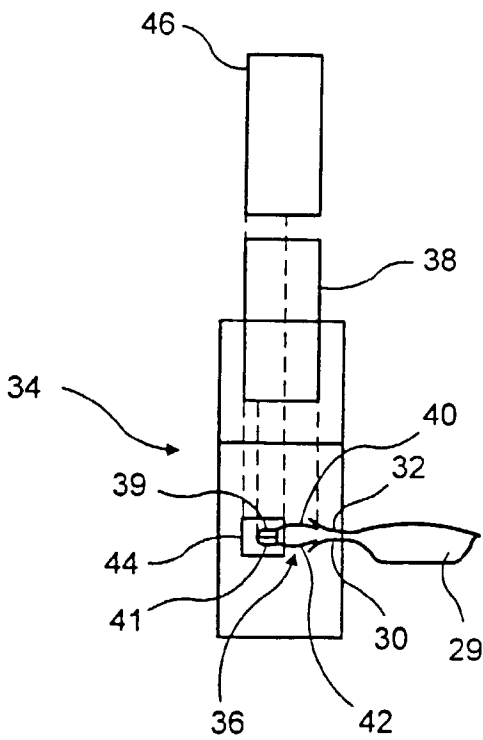


FIG. 3

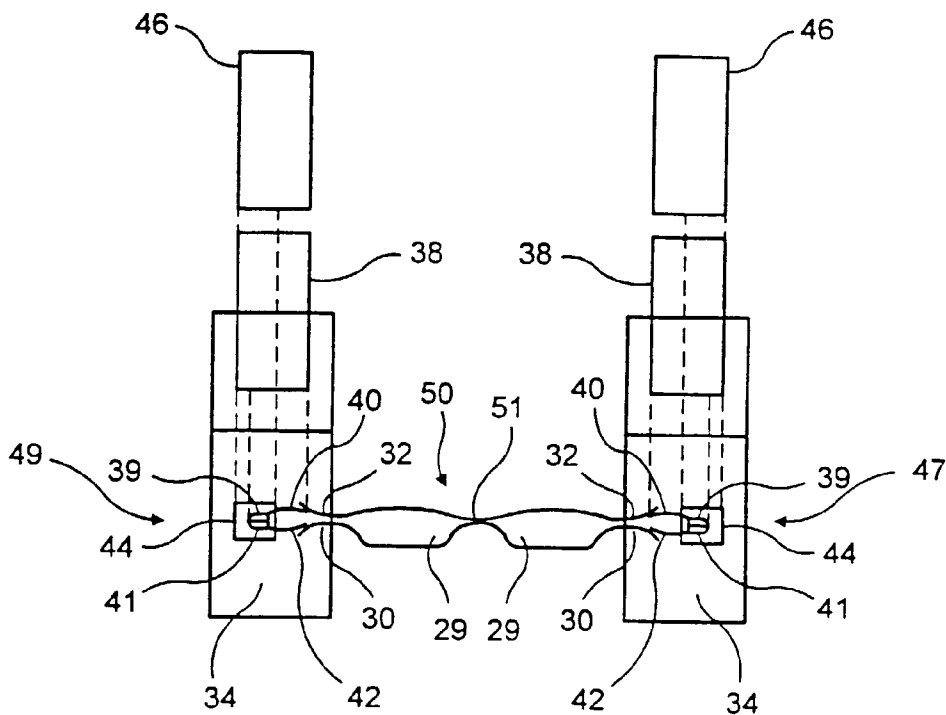


FIG. 4

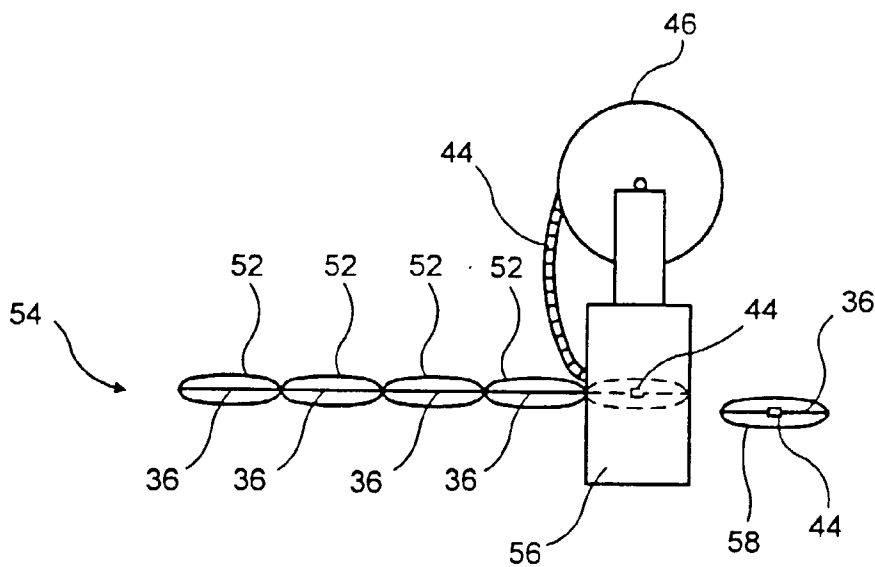


FIG. 5

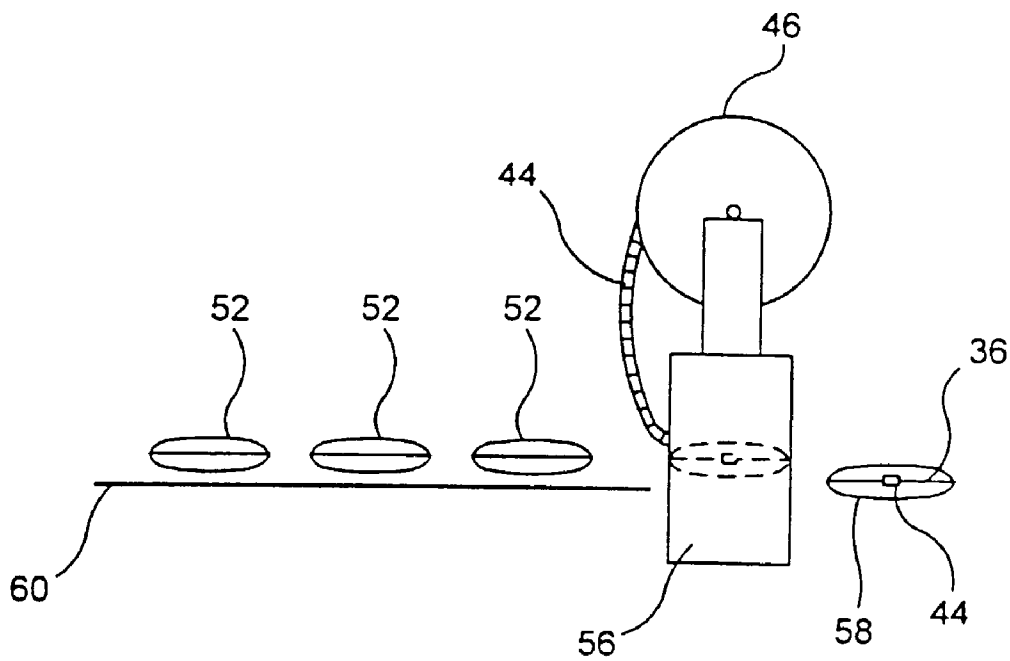


FIG. 6

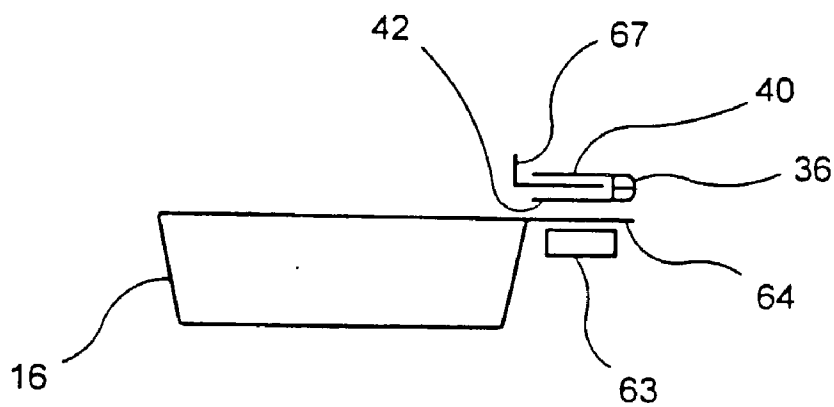


FIG. 7a

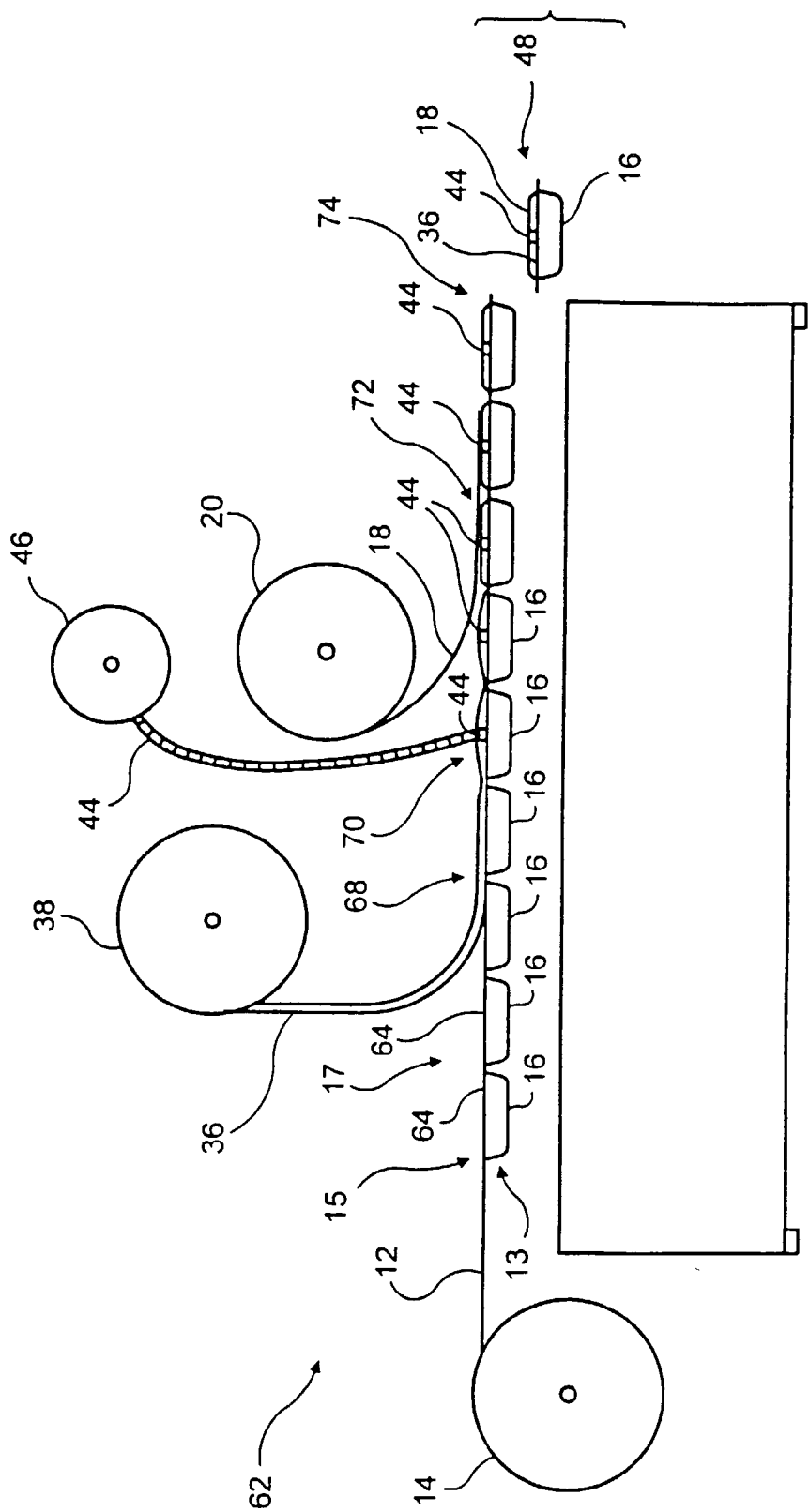


FIG. 7

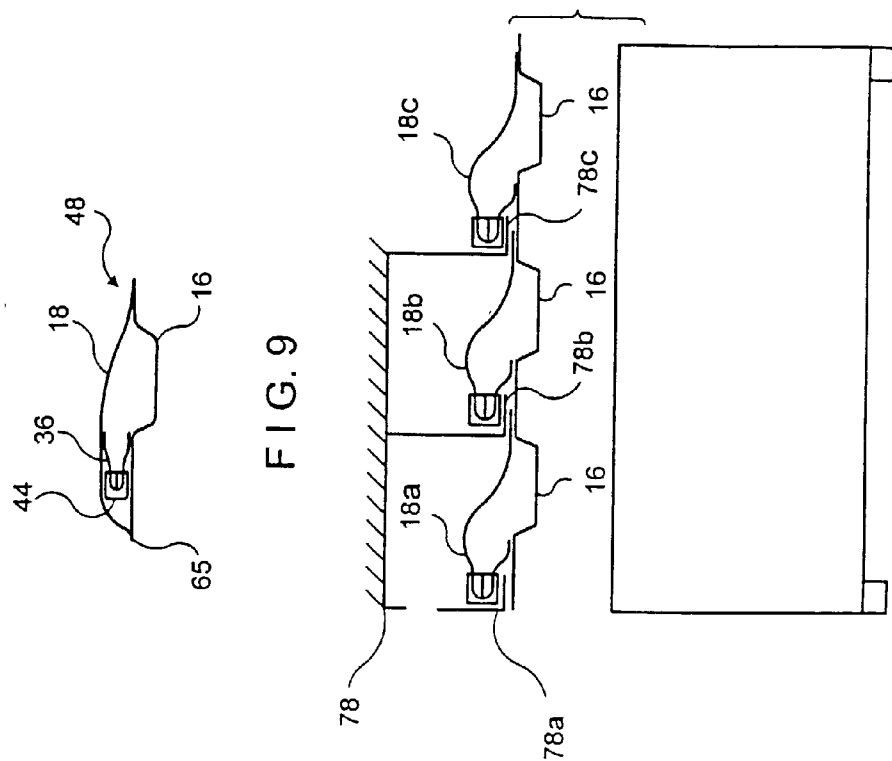
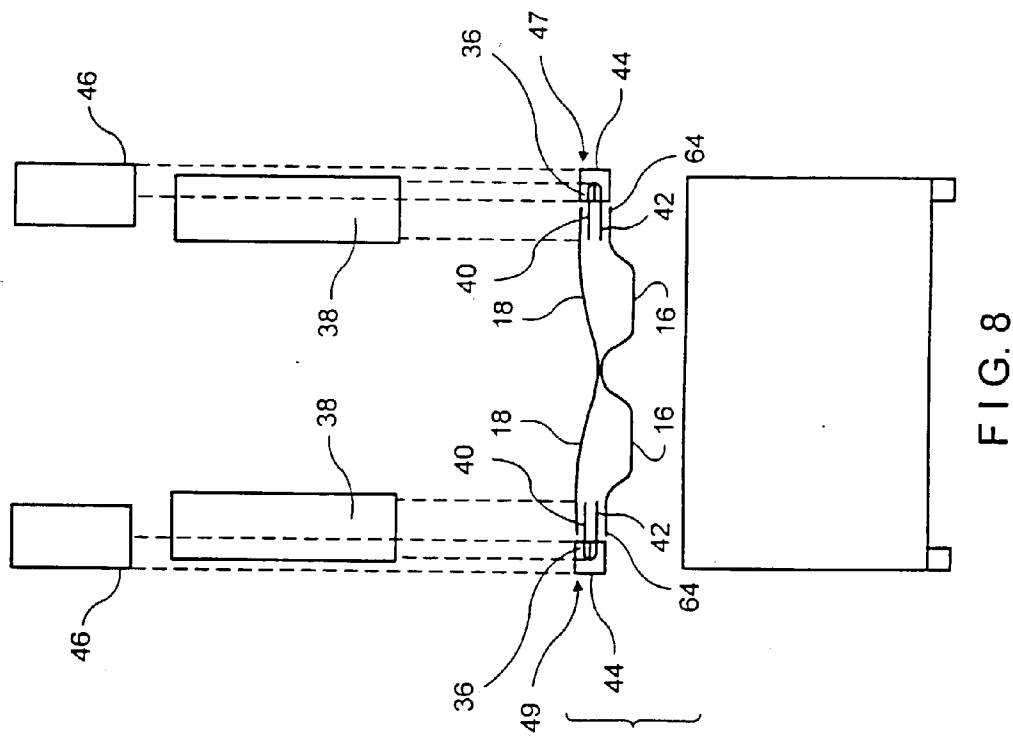


FIG. 11

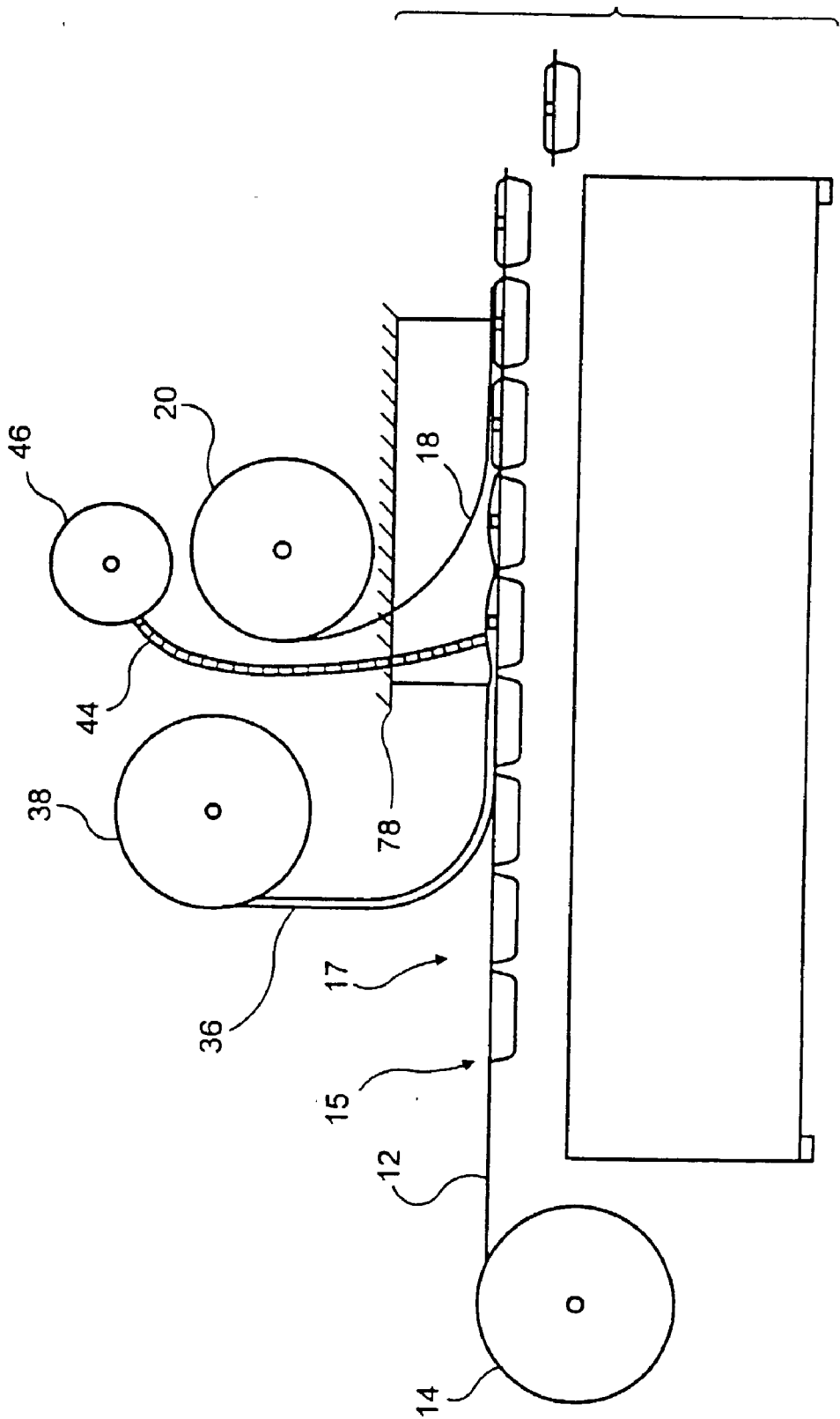
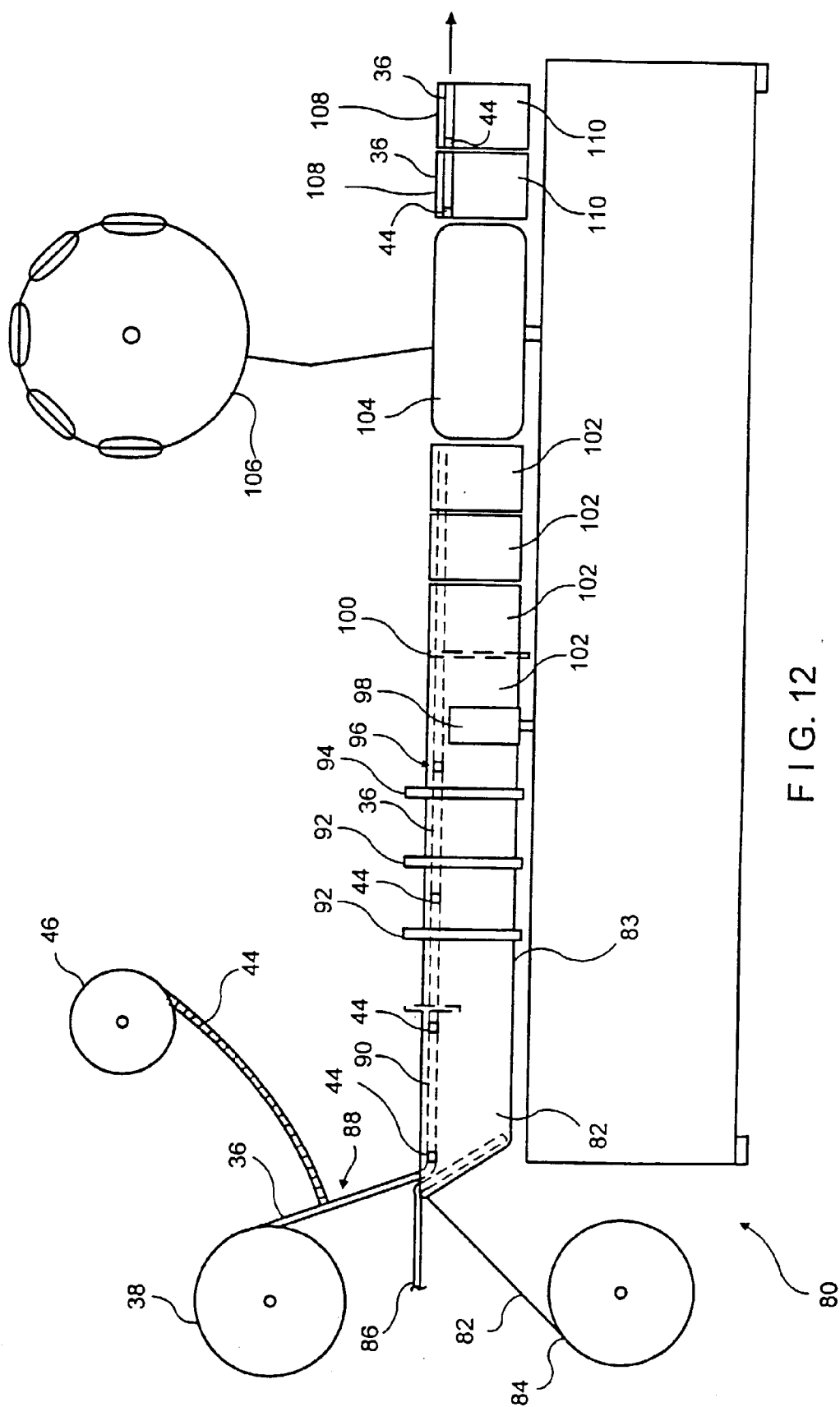
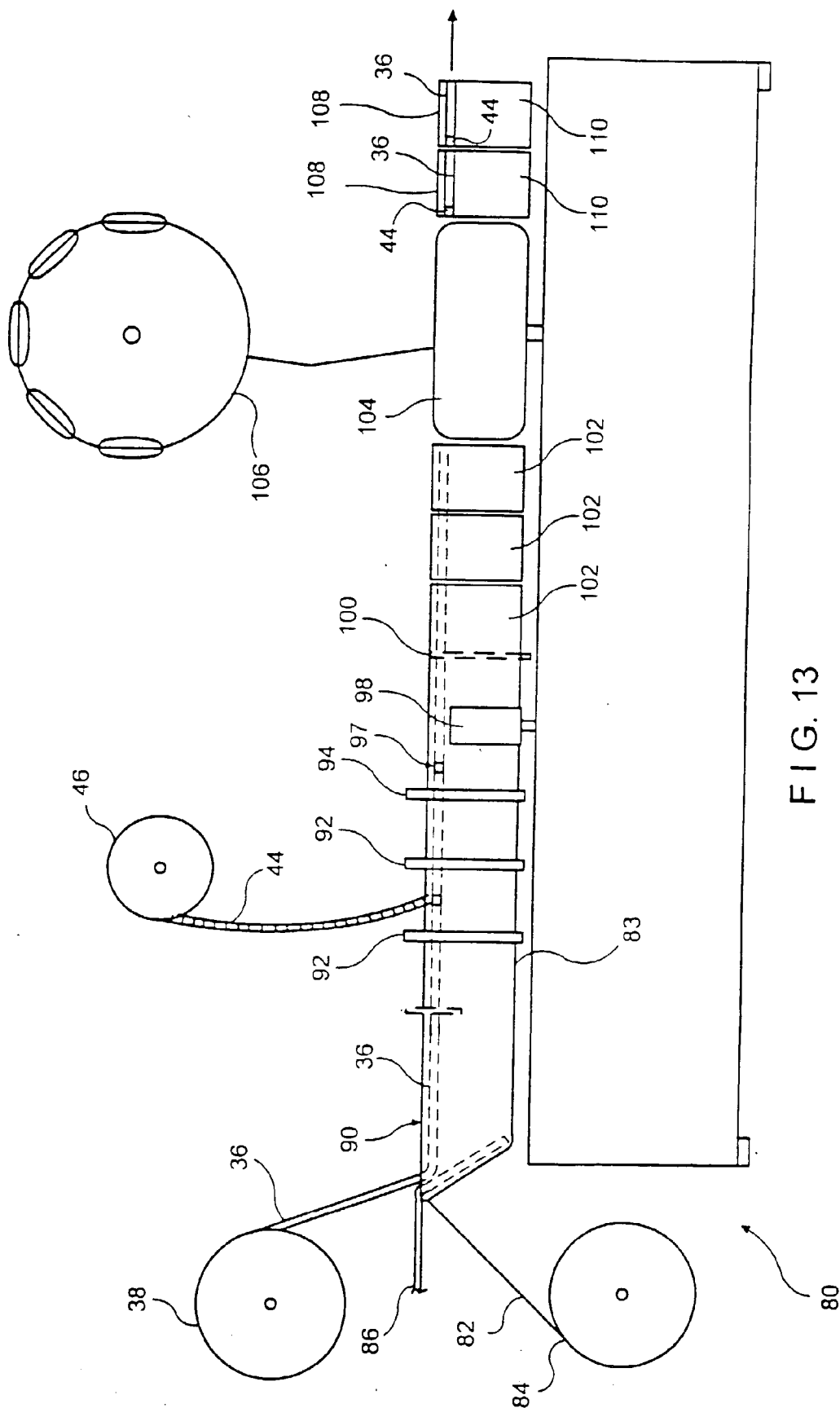
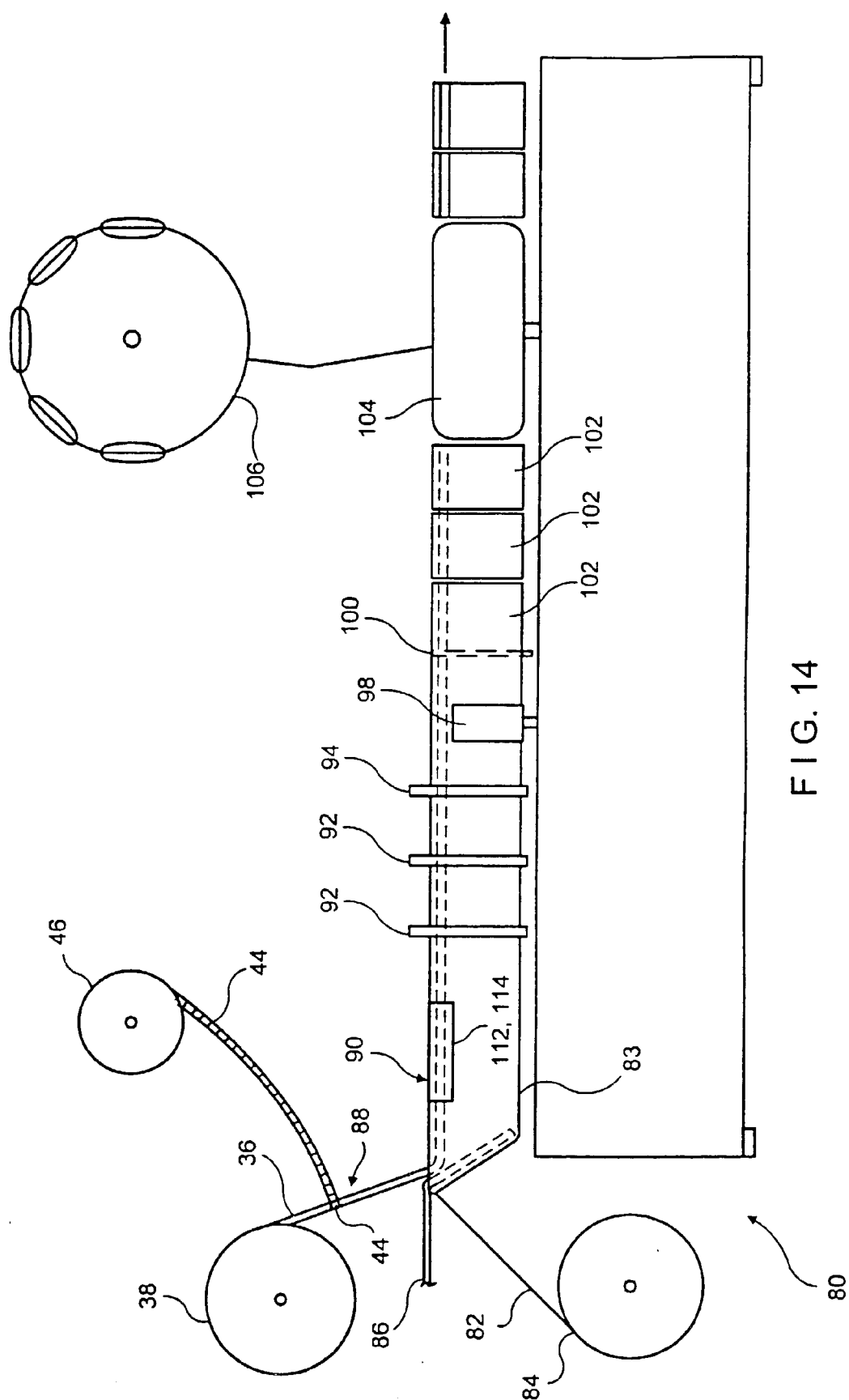


FIG. 10







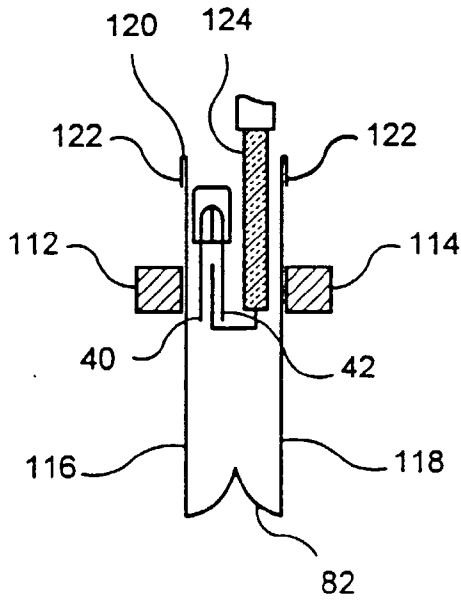


FIG. 15

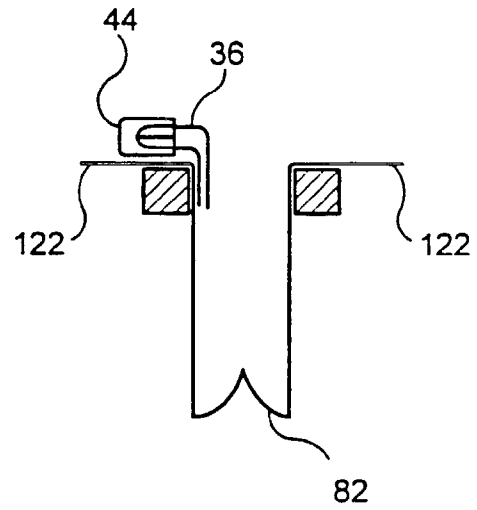


FIG. 16

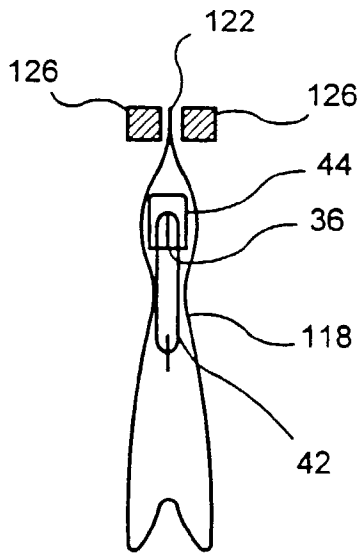


FIG. 17

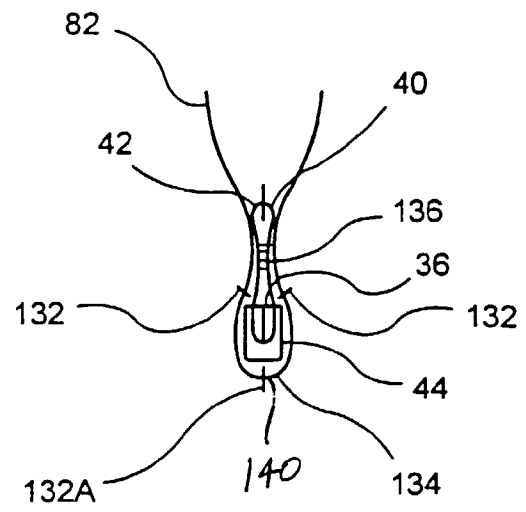
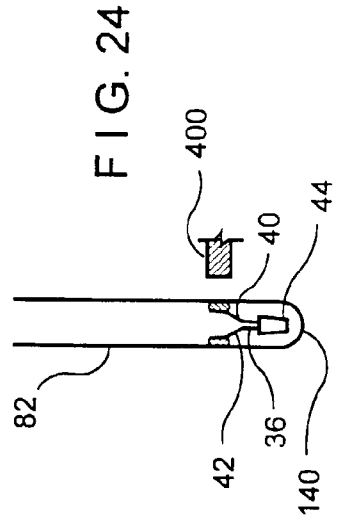
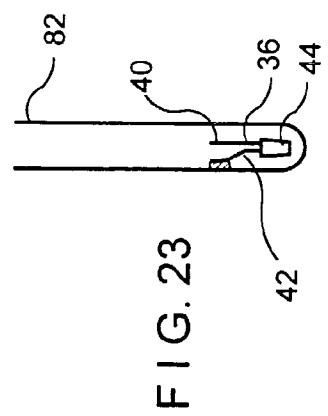
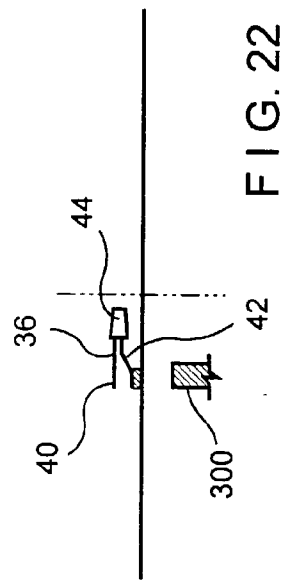
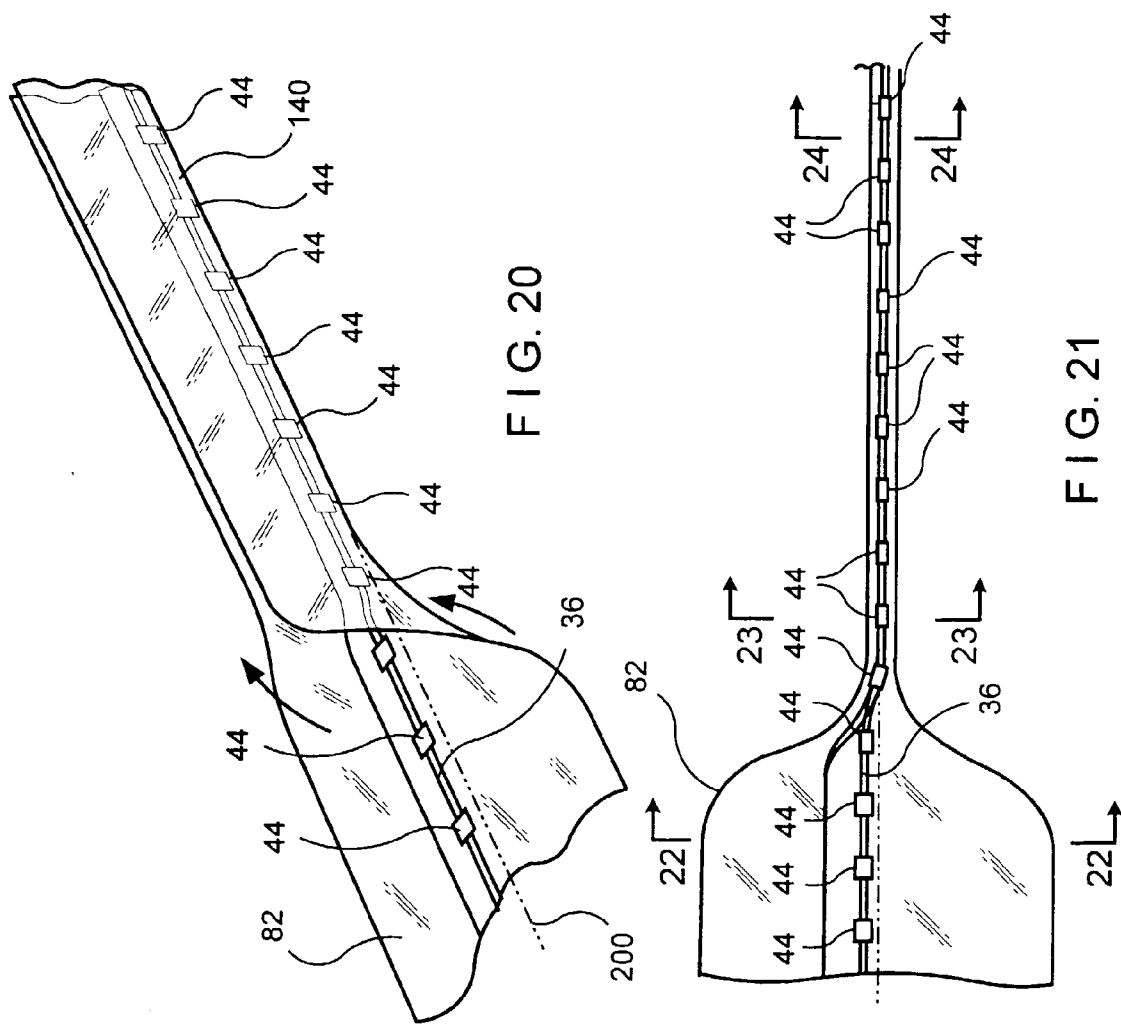


FIG. 19



METHODS OF MAKING SLIDE-ZIPPERED RECLOSABLE PACKAGES ON HORIZONTAL FORM-FILL-SEAL MACHINES

[0001] This application is a continuation-in-part of application Ser. No. 09/631,179 filed on Aug. 2, 2000 which, in turn, is a divisional of application Ser. No. 09/316,866, filed on May 21, 1999, now U.S. Pat. No. 6,138,439.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to the field of reclosable packaging. More particularly, the present invention relates to methods of making reclosable packages having slide zippers on horizontal form-fill-seal (HFFS) machines.

[0004] 2. Description of the Prior Art

[0005] Methods of making reclosable packages on various types of HFFS machines are well known in the reclosable packaging art, such as that disclosed in U.S. Pat. No. 4,876,842. Slide zippers, i.e., plastic zippers opened and closed by a slider, are likewise well-known in the reclosable packaging art. Examples of several types of slide zippers can be found in U.S. Pat. Nos. 5,007,143, 5,008,971, 5,131,121 and 5,664,299.

[0006] The reclosable packaging art, however, is virtually, if not totally, silent as it relates to the manufacture of slide-zipped packages on HFFS machines. Because of the facility which is provided by slide zippers to consumers of reclosable packages and because of the large volume of reclosable packages made on HFFS machines today, it is highly desirable and advantageous to combine the two technologies so that slide-zipped reclosable packages can be made on HFFS machines.

SUMMARY OF THE INVENTION

[0007] According to a first embodiment of the present invention, a chain of packages is formed, filled and sealed on an HFFS machine or the like. A pair of opposing film extensions are provided on each package. As the chain of packages is indexed forwardly, a reclosable zipper is inserted between the film extensions of the leading package and sealed thereto. A slider is then inserted on to the reclosable zipper of the leading package and the completed leading package is cut from the chain.

[0008] According to a second embodiment of the present invention, packages having reclosable zippers are output from an HFFS machine or the like, either individually or in a chain. A slider is then inserted on to the zipper of each package in turn.

[0009] According to a third embodiment of the present invention, packages are formed, filled and sealed on an HFFS machine or the like. During package formation, a reclosable zipper is sealed to each package and then a slider is inserted on to the zipper.

[0010] According to a fourth embodiment of the present invention, packages are formed, filled and sealed on a horizontal form-vertical fill-seal (HFVS) machine or the like. During package formation, a reclosable zipper is sealed to each package and a slider is inserted on to each zipper, either before or after zipper sealing.

[0011] According to a fifth embodiment of the present invention, a longitudinally oriented zipper with periodically occurring sliders is placed adjacent to a longitudinal center of a web whereby a first of two flanges of the zipper is sealed to the web. The web is folded about the longitudinal center so that the web engages both sides of the zipper and the second of the two flanges is likewise sealed to the web.

[0012] The present invention will now be described in detail, with frequent reference being made to the drawings identified below in which the same numerals represent the same elements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] In the accompanying drawings:

[0014] **FIG. 1** shows packages being made on an HFFS machine in accordance with a first embodiment of the present invention;

[0015] **FIG. 2** is a perspective view of a package made on the HFFS machine of **FIG. 1** prior to attaching the zipper;

[0016] **FIG. 3** is a cross-sectional view of the HFFS machine of **FIG. 1** at the slider insertion point;

[0017] **FIG. 4** is a cross-sectional view of a first variation of the HFFS machine of **FIG. 1**;

[0018] **FIG. 5** shows sliders being inserted on a chain of packages in accordance with a second embodiment of the present invention;

[0019] **FIG. 6** shows sliders being inserted on to individual packages in accordance with a variation of the second embodiment of the present invention;

[0020] **FIG. 7** shows packages being made on an HFFS machine in accordance with a third embodiment of the present invention;

[0021] **FIG. 7a** is a cross-sectional view of the HFFS machine of **FIG. 7** at the first zipper sealing station;

[0022] **FIG. 8** is a cross-sectional view of the HFFS machine of **FIG. 7**;

[0023] **FIG. 9** is a cross-sectional view of a package made on the HFFS machine of **FIG. 7**;

[0024] **FIG. 10** shows packages being made on an HFFS machine in accordance with a variation of the third embodiment of the present invention;

[0025] **FIG. 11** is a cross-sectional view of packages being made on the HFFS machine of **FIG. 10**;

[0026] **FIG. 12** shows packages being made on an HFVS machine in accordance with a fourth embodiment of the present invention;

[0027] **FIG. 13** shows packages being made on an HFVS machine in accordance with a first variation of the fourth embodiment of the present invention;

[0028] **FIG. 14** shows packages being made on an HFVS machine in accordance with a second variation of the fourth embodiment of the present invention;

[0029] **FIG. 15** is a cross-sectional view of reclosable zipper being sealed to one package side in the HFVS machine of **FIG. 14**;

[0030] FIG. 16 is a cross-sectional view of a package prior to being filled on the HFVS machine of FIG. 14;

[0031] FIG. 17 is a cross-sectional view of a tamper evident sealed being placed on a package made on the HFVS machine of FIG. 14;

[0032] FIG. 18 shows packages being made on an HFVS machine in accordance with a third variation of the fourth embodiment of the present invention;

[0033] FIG. 19 is a cross-sectional view of a package being formed on the HFVS machine of FIG. 18;

[0034] FIG. 20 is a perspective view of the film forming a package in accordance with a fifth embodiment of the present invention;

[0035] FIG. 21 is a top perspective view of the film forming a package in accordance with the fifth embodiment of the present invention;

[0036] FIG. 22 is a cross-sectional view along plane 22-22 of FIG. 21;

[0037] FIG. 23 is a cross-sectional view along plane 23-23 of FIG. 21; and

[0038] FIG. 24 is a cross sectional view along plane 24-24 of FIG. 21.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0039] In accordance with a first embodiment of the present invention, FIG. 1 shows how slide-zippered packages can be made on a typical thermoform HFFS machine 10. Forming film 12 is indexed off a coil 14 of the same in a package forming direction. Downstream of the forming film coil 14 at a forming station 15 the forming film 12 is thermoformed, using techniques well-known to those of ordinary skill in the reclosable packaging art, into a chain 13 of advancing box-like bottom portions or trays 16 of what will ultimately be completed packages. Product may then be loaded into the bottom portions 16 at a loading station 17 if desired. After optional product loading, top film 18 is indexed off a coil 20 of the same in the package forming direction, laid over the advancing bottom portions 16 and perimetrically sealed thereto at four locations 22, 24, 26, 28 at a sealing station 21 to form a sealed package 29, as shown in FIG. 2. The seal at the package opening 22 takes the form of a peel seal so that the consumer can easily gain access to the contents of the package.

[0040] As shown in FIG. 2, which is a perspective view of a sealed package 29 formed on the thermoform HFFS machine of FIG. 1 prior to zipper and slider insertion, the bottom portion 16 and top film 18 are each provided with film extensions 30, 32 which extend beyond the peel seal 22 on one side of the package 29. The film extensions 30, 32 are not sealed to each other and may readily be spread apart from each other.

[0041] After the top film 18 is sealed to the bottom portion 16 at the sealing station 21, the package chain 13 enters a zipper and slider insertion and attaching station 34. At this station 34 the film extensions 30, 32 of the leading package are spread apart from each other and interlocked reclosable zipper 36 supplied from a coil 38 of the same is fed between the film extensions 30, 32, as shown in FIG. 3, which is a

cross-sectional view of the package chain and zipper and slider insertion and attaching station 34. The zipper is comprised of two interlocking closure elements 39, 41 and flanges 40, 42 extending therefrom which are sealed to the film extensions 30, 32, such as by a pair of seal bars (not shown). After the zipper 36 is thus sealed to the film extensions of the leading package, the zipper 36 is stomped at each end of the package by a stomping apparatus (not shown) to provide end stops for the slider and to ensure that the ends of the zipper 36 do not come apart during use.

[0042] A slider 44 is then removed from a coil 46 thereof and inserted on to the zipper 36 by a slider insertion apparatus (not shown). The slider and zipper are designed such that the slider will open the zipper as the slider is moved along the zipper in an opening direction towards an opening end of the zipper and close the zipper as the slider is moved along the zipper in a closing direction towards a closing end of the zipper. It is preferable during slider insertion that the slider be inserted at the closing end of the zipper since the zipper is initially interlocked. The slider will thus be positioned for normal functioning. If the slider is inserted at a location other than at the closing end, it will be necessary to actuate the slider by moving it to the closing end, after which the slider will be in position for normal functioning. Such actuation may be done on the HFFS machine, or it may be done by the initial package user.

[0043] After slider insertion, the leading package is cross-cut from the remainder of the chain 13 by any one of many commonly known cutting apparatuses (not shown) to remove a completed package 48 having a slide zipper.

[0044] In practice, the package chain 13 may be a single chain as shown in FIG. 3, or, alternatively, may be a multiple chain, such as the double chain 50 shown in cross-section in FIG. 4. In the case of a double chain, where two packages are joined side by side, the process of making the packages is virtually identical to that described above, except that the zippers and sliders are attached to the opposite sides 47, 49 of the package chain simultaneously, as shown in FIG. 4, thus requiring two zipper and slider insertion and attaching stations 34. Additionally, a second cut is needed in the machine direction along the central axis 51 of the chain to remove the side-by-side packages from one another.

[0045] The foregoing embodiment of the present invention is not limited to practice on thermoform HFFS machines, but may be practiced on any type of package making machine where the packages are formed with film extensions 30, 32 of the type discussed above.

[0046] FIGS. 5 and 6 depict a second embodiment of the present invention. Zippered packages 52, either in a chain 54 as shown in FIG. 5 or individually as shown in FIG. 6, are output from an HFFS machine (not shown), or any other type of bag making machine. In the case of FIG. 5, the package chain 54 is indexed into a slider insertion station 56. At the slider insertion station 56 or at an earlier station, the ends of the zipper 36 on the leading package in the chain 54 are stomped as discussed above. Then, a slider 44 is removed from the slider coil 46 and inserted on to the zipper 36. Finally, a completed package 58 having a slide zipper is cross-cut from the chain by a cutting apparatus (not shown).

[0047] In the case of FIG. 6, the packages 52 are individual and not chained together. The individual packages 52

are transported one by one into the slider insertion station **56** by a conveyor belt **60** or the like, where the ends of the zipper **36** on the leading package are stomped (unless the stomping was done during package formation) and a slider **44** is removed from the slider coil **46** and inserted on to the zipper **36** to provide a completed slide-zippered package **58**.

[0048] In accordance with a third embodiment of the present invention, **FIG. 7** shows a thermoform HFFS machine **62** configured to make slide-zippered packages. As in **FIG. 1**, the forming film **12** is indexed off a coil **14** of the same. Downstream of the forming film coil **14** at a forming station **15** the forming film **12** is thermoformed into a chain **13** of box-like bottom portions or trays **16** of what will ultimately be completed packages. Product may then be loaded into the bottom portions **16** at the loading station **17** if desired. Each bottom portion **16** is provided with a lip **64** on one side thereof, as shown in **FIG. 8**, which is a cross-sectional view of the chain **13**. After optional product loading, the reclosable zipper **36** is indexed off a coil **38** of the same and laid over the lips **64** of the bottom portions **16**. The lower zipper flange **42** is then sealed to the lips **64** by a sealing mechanism, such as a heater bar **63**, at a sealing station **68**. The heater bar **63** is positioned below the lips **64**, as shown in **FIG. 7a**, which is a cross-sectional view of zipper attachment to the package lips. Also shown in **FIG. 7a** is an insulating and guide plate **67** positioned between the zipper flanges. The insulating and guide plate **67** provides a surface for the heater bar to react against and removes any danger of sealing through the zipper flanges, thereby eliminating the need for accurate heat control. The insulating and guide plate **67** also serves to guide and position the zipper onto the package lips to ensure accurate sealing.

[0049] A slider **44** is then removed from the slider coil **46** and inserted on to the zipper **36** of the instant bottom portion **16** at an insertion station **70**. After slider insertion, the ends of the zipper are stomped. Alternatively, the zipper ends could have been stomped together earlier, either on the machine or pre-stomped prior to winding on the supply coil, and the zipper indexed to the bottom portion. The top film **18** is then indexed off the top film coil **20**, laid over the formed bottoms **16** and the attached zipper **36** and sealed to the formed bottoms **16** and the upper flange **40** of the zipper **36** around the perimeter of the package at a second sealing station **72**. As discussed above, the seal at the mouth of the package may take the form of a peel seal to provide easy access to the contents of the package. Optionally, the top film **18**, if it is long enough, may be heat tacked to the bottom portion **16** over the zipper **36** to provide a tamper evident seal **65**, as shown in **FIG. 9**. In the final step, the completed packages **48** are cross-cut from the chain at a cutting station **74**. If a double chain is used, as shown in **FIG. 8**, then the side-by-side packages must also be cut from each other in the machine direction.

[0050] When making packages using multiple package chains, it is not necessary that the zippers and sliders be applied to opposite sides **47**, **49** of the package chain, as shown in **FIGS. 4 and 8**. Rather, it is also possible to apply the zippers and sliders to the same sides of the packages. For example, a triple package chain is shown in **FIGS. 10 and 11**. In this case the top film **18** is pre-perforated so that it can be split into three sections and laid over each of the bottom portions **16**. This splitting is achieved by a separator assembly **78** having three L-shaped separator plates **78a**, **78b**, **78c**.

As the top film **18** is indexed off its roll **20**, the vertical portions of the separator plates **78a**, **78b**, **78c** split the pre-perforated top film **18** into three portions **18a**, **18b**, **18c** and guide the three top film portions as they are laid over their corresponding bottom portions **16**. Additionally, the horizontal portions of the separator plates interact with the sealing mechanism to ensure that there is no seal through, eliminating the need for accurate heat control.

[0051] As indicated above, the present invention is not limited to thermoform HFFS machines, but may be practiced on any type of HFFS machine and on any type of bag making machine for that matter. **FIG. 12** shows how slide-zippered packages can be made on a horizontal form-vertical fill-seal machine (HFVS) **80** in accordance with a fourth embodiment of the present invention.

[0052] Package film **82** is paid off a roll **84** of the same. Downstream a pull roller **98** is provided for driving the film **82** through the machine. A folder plow **86** positioned downstream of the film roll **84** folds the package film **82** about a bottom fold or crease **83** to form opposing package walls **116**, **118**. Interlocked reclosable zipper **36** is then paid off a roll **38** of the same and fed between the advancing package walls. Sliders **44** are inserted on to the reclosable zipper **36** prior to the folder plow **86** at package width intervals at what will be the closing end of the zipper by a slider insertion mechanism at the slider insertion station **88**. The sliders **44** are supplied from the slider coil **46**.

[0053] At a first sealing station **90**, the zipper flanges **40**, **42** are sealed to the opposing package walls. Then at stomping stations **92**, the ends of the zipper **36** for a given package are stomped. At a second sealing station **94**, the folded film and zipper are cross-sealed to form discrete packages.

[0054] Because the zippers are closed, it is necessary to open the zippers in order to fill the packages. This is achieved at a slider opening station **96**, where the slider is held in position as the zipper and film are advanced when the pull rollers **98** are activated. As the zipper moves through the slider, it is opened. Alternatively, the slider itself may be moved. Then, at a cutting station **100** the individual packages **102** are cut from one another. The separated packages **102** are then taken to the filling station **104** where they are filled. Filling may occur by means of a filling turret **106** or the packages may be filled in-line, both of which techniques are well-known to those of ordinary skill in the art. After a package is filled, the slider **44** is moved backed to the closing end of the zipper. Finally, a tamper evident **108** seal may optionally be provided above the zipper **36**. Completed slide-zippered packages **110** are then output from the machine.

[0055] A first variation of the fourth embodiment is shown in **FIG. 13**. As is clear from **FIG. 13**, the sliders are attached downstream of the folder plow **86**, rather than upstream of the folder plow **86**. Additionally, the sliders **44** are attached to the zippers **36** at their opening ends, rather than at their closing ends as above. Thus, in order to open the zippers for package filling the zippers must be forced open from the outside of the packages, rather than by using the sliders. This opening action is carried out at an opening station **97** by a suitable mechanism provided for the specific zipper construction. After filling at the filling station **104**, the slider is moved to the closing end of the zipper.

[0056] A second variation of the fourth embodiment of the present invention is shown in FIG. 14. Under certain circumstances it may be desirable to eliminate the step of opening the zipper for filling. This can be done by sealing one zipper flange to one side of the folded film at the first sealing station 90 prior to filling, as shown in FIG. 15, rather than sealing both flanges to the film as done previously.

[0057] As shown in FIG. 15, one flange 40 of the zipper is sealed to one wall 116 of the folded film 82 a distance below the top 120. The film 82 protrudes above the zipper to form a pair of opposing ears 122. To ensure that the zipper flanges 40, 42 do not seal to each other or the other side of the package at the first sealing station 90, a J-shaped insulator plate 124 is inserted between the zipper flanges 40, 42 and between the unsealed zipper flange 42 and the other package wall 118, as shown in FIG. 15. In addition, one of the seal bars 112 is kept hot and the other 114 is deactivated. Then, at the second sealing station 94, the packages are cross-sealed from the bottom of the film 92 up to but not including the zipper. When it comes time to fill the bag at the filling station 104, the zipper is bent to one side, as shown in FIG. 16. In this manner, filling may proceed unobstructed, and there is no danger of contaminating the zipper. After filling, the unsealed zipper flange 42 is sealed to the other side of the package and the ears 122 are sealed to each other by a pair of seal bars 126 with a perforation seal and a peel seal above the zipper 36, as shown in FIG. 17. At the same time the ends of the zipper are cross-sealed together and end stops for the slider are created. The above indicated zipper cross-seals extend below the zipper flanges into the package side seals, but not above and beyond the zipper profiles.

[0058] In this variation, the order of the steps can be varied. For instance, the zipper 36 could be fed to the film 82 and the zipper flange 40 could be sealed to the film 82 prior to the folding step.

[0059] A third variation of the fourth embodiment of the present invention is shown in FIG. 18. In this variation, the zipper 36 and slider 44 are attached to the bottom 128 of the package, rather than at the top 120. As the film 82 is fed over the folder plow 86, a perforator 130 perforates the film 82 below the slider 44 to form a pair of lines of perforation 132 (alternatively, a single line of perforation 32a may be provided, additionally other lines of weakness may be substituted for the line or lines of perforation). As shown in FIG. 19, the film 82 includes bottom fold 140 from which panel walls rise vertically. The zipper is then sealed adjacent to the bottom fold 140 of the package by sealing the zipper flanges to the film beyond the perforation lines, as shown in FIG. 19. A peel seal 136 may be provided between the zipper flanges in order to maintain the integrity of the packages.

[0060] The packages are completed as discussed above, except that they are filled from the opposing end to which the zipper has been attached. Further, if a bottom gusset is required a V shaped film can be introduced between the package walls 116 and 118 and sealed into place. During use, the packages are inverted so that the zipper and slider are at the top and the perforated portion 134 is torn away from the package to gain access to the slider.

[0061] FIGS. 20-25 illustrate a fifth embodiment of the invention. Zipper 36, including flanges 40 and 42, is placed

adjacent to or offset from the center longitudinal or machine direction line 200 of film 82. Sliders 44 have been previously placed at package-width intervals along zipper 36. As shown in FIG. 22, flange 42 is sealed to film 82 by sealing bar 300. As shown in the central portions of FIGS. 20 and 21 and in the cross-sectional view of FIG. 23, film 82 is subsequently folded over zipper 36 so that flange 40 is urged toward film 82 at a position which is likewise adjacent to or offset from the longitudinal or machine direction centerline of film 82. As shown in FIG. 24 and the rightmost portions of FIGS. 20 and 21, film 82 is then oriented into a vertical position and flange 40 is sealed to film 82 by sealing bar 400. Center longitudinal or machine direction line 200 thereafter forms bottom fold 140 and a structure similar to that of FIG. 19 is formed and the packages are similarly filled and separated.

[0062] Thus, in the foregoing manner the object of the present invention is achieved.

[0063] Modifications to the above would be obvious to those of ordinary skill in the art, but would not bring the invention so modified beyond the scope of the appended claims.

We claim:

1. A method of making reclosable packages, said method comprising the steps of:

feeding a supply of package film in a package forming direction;

folding said package film about a bottom fold to form opposing package walls, said opposing package walls advancing in said package forming direction;

feeding a supply of interlocked reclosable zipper between said opposing package walls, said interlocked reclosable zipper including mounted sliders, each of said mounted sliders being adapted to open and close said reclosable zipper as said slider is moved along said reclosable zipper in opening and closing directions, respectively;

sealing said reclosable zipper to said opposing package walls adjacent to said bottom fold; and

cross-sealing said folded film at package-width intervals to form a chain of packages, each of said packages having a reclosable zipper and a slider.

2. The method of claim 1 further including the step of forming at least one line of weakness in said package film.

3. The method of claim 2 wherein said at least one line of weakness is formed between where said zipper is sealed to said opposing package walls.

4. The method of claim 2 wherein said at least one line of weakness is formed proximate to said bottom fold.

5. The method of claim 2 wherein said step of forming said at least one line of weakness is substantially simultaneous with said step of folding said package film.

6. The method of claim 1 further including the step of forming one line of weakness on each of said opposing package walls between said bottom fold and where said zipper is sealed to respective said opposing package walls.

7. The method of claim 1 wherein said sliders are inserted on to said reclosable zipper prior to said reclosable zipper being fed between said opposing package walls.

8. The method of claim 1 further including the step of filling said reclosable package with product at an end opposite to said bottom fold.

9. The method of claim 8 further including the step of sealing said reclosable package at said opposite end after said step of filling.

10. The method of claim 1 further including the step of providing a peel seal between elements of said interlocked reclosable zipper.

11. The method of claim 1 further including the step of cutting each of said packages from said chain of packages.

12. The method of claim 1 wherein ends of said reclosable zipper of each package are cross-sealed.

13. The method of claim 1 wherein said reclosable zipper supply is stomped at package-width intervals.

14. A method of making reclosable packages, said method comprising the steps of:

feeding a supply of package film in a package forming direction;

sealing a first portion of a reclosable zipper on said package film adjacent to a first side of a central machine direction position;

folding said package film about said central machine direction position to form opposing package walls; and

sealing a second portion of said reclosable zipper to said package film adjacent to a second side of said central machine direction position.

15. The method of claim 14 wherein said reclosable zipper includes a plurality of sliders spaced at package-width intervals.

16. The method of claim 14 wherein said step of folding forms a fold along said central machine direction position.

17. The method of claim 14 further including the step of cross-sealing said folded film at package-width intervals to form a chain of packages.

18. The method of claim 14 wherein said first portion of said reclosable zipper includes a first flange and wherein said second portion of said reclosable zipper includes a second flange.

19. A method of making reclosable packages, said method comprising the steps of:

feeding a supply of package film in a package forming direction, said packaging film including first and second portions for defining first and second opposing package walls;

22. The method of claim 21 further including the step of urging said zipper toward said first opposing package wall prior to said step of filling.

23. The method of claim 19 wherein said zipper feeding step is subsequent to said package film folding step.

24. The method of claim 19 wherein said first flange sealing step is subsequent to said package film folding step.

* * * * *