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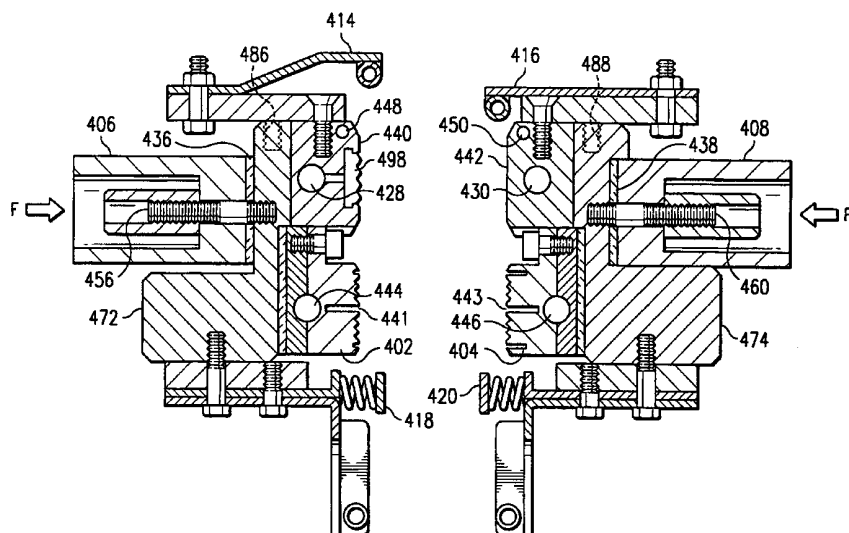
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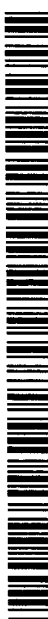
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(54) Title: SEAL JAW MODULES FOR RECLOSE BAG MODIFICATION TO VERTICAL FORM, FILL, AND SEAL PACKAGING SYSTEM



(57) Abstract: A self-aligning zipper seal module adapted for quick change-out in a sealing carriage. The zipper seal module allows for a quick modification of a sealing carriage in order to accommodate different package dimensions. The module is stored and is installed in a closed and aligned position by an aligning handle (576). The module is easily installed or removed with a single tool and is designed to reduce the potential for operator injury by isolation from heat source and by virtue of the aligning handle. The various sealing facings of the module are oriented to equalize pressure on the facings during sealing and increase stripping efficiency. The zipper sealing facings (440, 442) incorporate a novel insert design (798), thereby eliminating the need for stocking different sized facings to accommodate various bag widths. A return module of similar design is used to quickly return the sealing carriage to a standard configuration.



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APPLICATION FOR
UNITED STATES LETTERS PATENT

FOR
**SEAL JAW MODULES FOR
RECLOSE BAG MODIFICATION TO
VERTICAL FORM, FILL, AND SEAL
PACKAGING SYSTEM**

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BACKGROUND OF THE INVENTION

1. Technical Field

The present invention relates to a reclose or zipper seal jaw design for use in a sealing carriage of a vertical form and fill packaging machine, and, in particular, to a quick-change, reclosable zipper seal jaw module and standard or "return" module that can accommodate variable bag sizes. The modules are self-aligning, easily installed on existing bridge assembly hardware, and incorporate several safety enhancements.

2. Description of Related Art

Vertical form, fill, and seal packaging machines are commonly used in the snack food industry for forming, filling, and sealing bags of chips and other like products. Such packaging machines take a packaging film, such as polypropylene, from a sheet roll of said film, and forms the film into a vertical tube around a product delivery cylinder. The vertical tube is vertically sealed along its length to form a back seal. The machine applies a pair of heat-sealing jaws or facings against the tube to form a transverse seal. This transverse seal acts as the top seal on the bag below and the bottom seal on the package being filled and

formed above. After the seal has been formed, the film tube is pushed downward to draw out another package length. The package below the transverse seal is separated by cutting across the sealed area.

Before each transverse seal is formed by the sealing jaws, the product to be packaged is dropped through the product delivery cylinder and formed tube and is held within the tube above the bottom transverse seal. Prior to forming the upper transverse seal, the sealing jaws are brought together in two steps. First, a pair of stripping plates or bars are brought into contact with the film in order to flatten the tube and strip product out of the area to be sealed. Second, the final closing movement of the jaws is performed, thereby forming the transverse seal.

The bag sealing functions of a vertical form, fill, and seal machine are best described with reference to **Figures 1a and 1b**. **Figure 1a** shows a sealing carriage on a prior art form, fill, and seal packaging machine. **Figure 1b** is a cross-section of a prior art facing assembly installed in said carriage. Opposed transverse seal jaw facings **102, 104** (hereinafter referred to by Applicants as “jaw facings”) are shown attached to opposed bridge assemblies **106, 108**. Behind each jaw facing **102, 104** is a heat probe **128, 130** capable of heating the exposed surface of the jaw facings up to 405°F during operation. Placed between the jaw facings **102, 104** and their respective bridge assemblies **106, 108** is a heat separator **136, 138**. The heat separators **136, 138** provide a thermal barrier between the jaw facings **102, 104** and the bridge assembly **106, 108** in order to minimize heat transfer to the bridge assembly **106, 108** and other components attached thereto. A thermocouple or thermostat **132, 134** is placed between the heat separator **136, 138** and the heat probe **128, 130** in order to monitor the jaw facing **102, 104** temperature. As previously described, a transverse seal is formed when a tube of film placed between the jaw facings **102, 104** is flattened as the jaw facings **102, 104** are brought in close proximity to each other. This is accomplished by both bridge assemblies

106, 108 traversing towards each other while riding on two stationary rods **110, 112**.

Also shown attached to the bridge assemblies **106, 108** are a pair of opposed crumb plates **114, 116**. When the bridge assemblies **106, 108** are brought together, the crumb plates **114, 116** slightly overlap, thereby forming a temporary “S” shaped constriction in the

5 flattened film tube. This “S” shaped constriction provides a means for keeping product out of the transverse seal area while the tube of film above the constriction is filled with product.

Two stripper bars **118, 120** are also shown attached to the bridge assemblies **106, 108**. The stripper bars **118, 120** are typically spring loaded and provide the stripping function previously described.

10 Both of the jaw facings **102, 104** are constructed with a central channel **141, 143** to accommodate a knife or cutting tool **122**. This knife **122** is recessed within the channel **141** of one of the jaw facings **102** and held in place by two knife brackets **124, 126** attached to the bridge assemblies **106, 108**. After the transverse seal has been formed on the flattened film tube, the knife brackets **124, 126** are rotated slightly, thereby exposing the knife **122** to the

15 transverse seal. This action cuts the transverse seal, thereby completing the process of forming, filling, and sealing a single package.

The prior art carriage described above is designed such that the jaw facings **102, 104** can be removed in order to install jaw facings **102, 104** that provide for different vertical widths of the resultant transverse seals. The facing assembly shown in **Figure 1b** is aligned

20 at the factory, and removal from the sealing carriage by the operator of more than the jaw facings **102, 104**, crumb plates **114, 116**, and stripper bars **118, 120** is not recommended. Such design is also not easily adapted to the formation of a zipper seal along with the standard transverse seal. In fact, as will be explained below, a form, fill, and seal packaging system must be substantially modified when it is used to install a zipper seal at the top of the

25 package.

A zipper seal is a resealable barrier that can be installed on the top end of a bag either immediately below or above the upper transverse seal. After the consumer breaks the upper transverse seal to gain access to the product within the package, the zipper seal can be reclosed, thereby keeping the product fresh. Such package is referred to as a “reclose” bag.

5 Consequently, the terms “zipper seal module” and “reclose module,” and many other descriptive terms using as adjectives the words “zipper” or “reclose,” are used herein by Applicants interchangeably.

Figures 2a and 2b show one embodiment of a reclose food package **281** incorporating a zipper seal **283**. **Figure 2a** is a perspective view of a flexible, plastic package or bag **281** used to contain potato chips, tortilla chips, and the like. **Figure 2b** is a cross-section of the top of said bag **281**. The food package **281** shown is typical in that it has an upper transverse seal **285** and a lower transverse seal **287**. However, this bag also uniquely incorporates a zipper or reclose seal **283** immediately below the upper transverse seal **285**. The zipper seal **283** is made up of a male engagement member **291** and a female engagement member **289**.

For the embodiment illustrated, the package **281** is opened for the first time by pulling on the exterior walls of the package **281** below the zipper seal **283**. The two opposed members **289, 291** separate, thereby opening the zipper seal **283**. Stress can then be exerted on the upper transverse seal **285** until it opens. Once this occurs, the package **281** is fully opened and the product, such as tortilla chips **293**, may be consumed. The package **281** can then be resealed by applying pressure to the exterior of the package **281** along the zipper seal **283**, thereby forcing the male engagement member **291** back into the female engagement member **289**. This novel reclose bag design is described in detail in United States Patent Application number 09/079,382 filed on May 15, 1998.

25 When making the reclose bag **281** illustrated, the opposed members **289, 291** (of the

zipper seal **283**) must be heat sealed to the inside surface of the food package **281**. Further, these opposed members **289, 291** must be heat-sealed together at each end **295, 297**. This is accomplished by applying a heat and pressure sealing device to an outer areas of the zipper seal **283**.

5 The film that enters a form and fill machine to form the reclose package **281** shown in **Figure 2a** is typically a continuous sheet with graphics presented on one side. The side of the sheet on which the graphics are presented will ultimately comprise the outside of the package **281**. The unprinted side of the sheet will ultimately comprise the inside of the package **281**. Prior to entering the form and fill machine, zipper seals **283** must be attached
10 to the inside film surface by securing one of the opposed members **289, 291** on the inside surface of the film with the zipper seal **283** in the closed configuration position. The zipper seal **283** thus secured should be oriented such that when the upper transverse seal **285** is formed on the package **281**, the zipper seal **283** is located in its proper position below and parallel to the upper transverse seal **285**. This will allow for the formation of both the
15 transverse seal **285** and the permanent attachment of the zipper seal **283** to the inside of the package **281**. The simultaneous formation of the transverse seal **285** and the installation of the zipper seal **283** can be accomplished with an extensively modified prior art sealing carriage, in part by installing a second set of facings for sealing the zipper seal into the package along with the existing set of facings. As will be described, such adaptation of an
20 existing form and fill sealing carriage makes for a number of technical difficulties and unsatisfactory results.

Figures 3a and 3b illustrate one prior art embodiment known to Applicants of a modification of a sealing carriage to accommodate the formation of a reclose bag. **Figure 3a** is a perspective view of a modified sealing carriage, while **Figure 3b** is a cross-section of the
25 modified facing assembly. By comparing **Figures 3a and 3b** with **Figures 1a and 1b**, it is

evident that a second set of opposed facings **340, 342** have been installed below the first opposed set of facings **302, 304**. The second set of opposed facings **340, 342** are the means for sealing the zipper below the transverse seal on the reclose bag. Consequently, they are known as zipper seal jaw facings **340, 342** and referred to herein by Applicants as “zipper seal facings.” The stripper bars **318, 320** are now attached below the zipper seal facings **340, 342**. Each of the zipper seal facings **340, 342** must also have a respective heat probe **344, 346** and thermosters **348, 350**.

Prior art modifications to the sealing carriage of a form and fill packaging system to accommodate the manufacture of reclose bags are not easily installed, have exhibited poor performance characteristics, raise several safety concerns, and are only suitable for one package size and zipper configuration. Consequently, the modification shown in **Figures 3a and 3b** is not a desirable fix. As will be explained, the purchase of a dedicated form and fill machine only capable of constructing reclose bags is also not an acceptable alternative.

By way of background, most chip packaging facilities have on-site one to several (and perhaps as many as seven or eight) vertical form, fill, and seal packaging machines. A single packaging facility might be required in any given week to package several different product lines in numerous different bag sizes for each product line by using the same form and fill packaging machines. Each form and fill packaging machine is quite expensive, for example, in the range of \$50,000 to \$150,000, and represents a large capital investment.

Consequently, it is critical to the economic efficiency of the packaging facility that each form and fill machine be capable of being quickly adapted to handle a variety of bag widths and lengths. This is easily done with the prior art vertical form, fill, and seal machine discussed herein for standard (non-reclose) bags. The facings **102, 104** (shown in **Figure 1a**) can accommodate any required bag width up to the total width of the facings **102, 104**. The bag length is easily adjusted by changing the amount of film travel below the facings **102, 104**.

However, converting a prior art vertical form, fill, and seal machine from the configuration shown in **Figures 1a and 1b** to the configuration shown in **Figures 3a and 3b** requires extensive modifications to the machine to allow for additional attaching points, electrical connections, controls, and to accommodate additional stripper travel. Once these
5 modifications are made, it typically takes several hours to install the additional set of facings and accompanying heat probes, stripper plates, and other required items. It then takes an additional several hours to reconvert the assembly back to a standard transverse seal configuration.

It is expected that a typical packaging facility will only need to dedicate a small
10 portion of the packaging assets to the formation of reclose bags incorporating zipper seals. Consequently, a permanent changeover to a reclose bag configuration or the use of a specifically built reclose bag machine would result in such packaging machine sitting idle for long periods of time. The ability to quickly change over from a standard transverse seal configuration to a reclose configuration is, therefore, a major consideration. The present
15 down-time involved in changing from one configuration back to the other, which is in excess of several hours, adds considerably to the labor costs in running reclose bags and reduces the overall packaging capacity of any single packaging facility.

Along the same lines, prior art reclose designs allow for the production of only one bag width for any given set of zipper seal facings **340, 342**. This is due to the fact that the
20 zipper seal facings **340, 342** have a rectangular shaped recess in order to accommodate the zipper seal while at the same time sealing the zipper seal at each end and around its edges to the inside of the bag. If a change in bag size is required for a reclose bag, the zipper seal facings **340, 342** must be removed from the reclose assembly and replaced with a new zipper seal facing **340, 342** to accommodate the new bag's width. This again takes two to four
25 hours to accomplish, thereby requiring additional man hours and reducing the efficiency of

the packaging facility. The zipper seal facings **340, 342** are also expensive items, presently costing approximately \$7,500.00 per each set of facings **340, 342**. Capital investment must therefore be made for every conceivable bag width so that a specific sized zipper seal facing **340, 342** can be on hand whenever a corresponding bag width needs to be run on the form and fill machine in the reclose configuration.

The need to replace components on the modified carriage and facing assemblies shown in **Figures 3a and 3b** increases the safety hazards involved in such change over operation. In order to remove or install the zipper facings **340, 342** and related components, it is necessary to bring the carriage to the open position. An inadvertent activation of the closing feature of the carriage while an operator is attempting to remove or install a component could result in serious injury. Further, during operation the various facings **302, 304, 340, 342** are heated to 350°F. In order to remove the facings **302, 304, 340, 342** after operation, they must either be allowed to cool or careful attention must be paid to insure that the operator is not burned by the facings **302, 304, 340, 342** or accompanying heat probes **328, 330, 344, 346**. The cutting knife **122** is also extremely sharp and must be carefully removed.

The placement of the zipper seal facing **340, 342** below the standard jaw facing **302, 304** also introduces several problems. It can be seen from **Figures 2b and 3b** that the area that is required to be stripped of product prior to applying both a standard transverse seal and a reclose seal is approximately doubled in length compared to the area that requires stripping when only a transverse seal is formed. More importantly, with the zipper seal **283** located below the transverse seal **285**, the zipper seal **283b** is closest to the product and will always have to be stripped even if portions of the transverse seal **285** do not require stripping. This is problematic in that the zipper seal **283** is significantly thicker than the transverse seal **285**. Effective stripping widths for a transverse seal **285** are on the order of .030 inches, while

effective stripping widths for a zipper seal **283** are on the order of .125 inches.

Consequently, stripping efficiency of the transverse seal area is lost because the strippers must be set to accommodate the thicker zipper seal **283** located below. Further, the chassis or frame of the form and fill machine must be modified to allow space for stripping in light of
5 the addition of components below the existing facings and accompanying stripper bars. The alternative is to limit the amount of stripping travel, which in turn limits the ability to remove product from the sealing areas.

It is also evident that the zipper seal facings **340, 342**, unlike the jaw facings **302, 304**, are not centered along the axis of the closing force acting on the carriage. **Figure 3b** shows
10 two force vectors **F** indicating that the force exerted on the assembly is centered along the axis of travel of bridge assemblies **306, 308** along the stationary rods **310, 312**. These force vectors typically produce a pressure of 1000 to 1200 psi along the facings **302, 304** during seal formation. However, the rigidity of the facing assembly shown in **Figure 3b** is not sufficient to equally distribute this pressure because of the cantilevered location of the zipper
15 seal facings **340, 342** away from the centerline of the supporting bridge assemblies **306, 308**. The zipper seal facings **340, 342** act as lever arms rotating away from the force **F** centered on the bridge assemblies **306, 308**. Unless this phenomena is counteracted, sufficient pressure cannot be applied on the zipper seal to adequately and uniformly attach it to the inside of the bag. A prior art fix to this problem is to install springs (not shown) behind the zipper seal
20 facings **340, 342** in order to counteract the rotating effect. This fix has been demonstrated to reduce the overall pressure applied by the carriage assembly on the bag film. To counteract this loss of pressure, the heat or the dwell time must be increased, or both. Increasing the dwell time reduces the productivity of the bag maker, while heat can only be increased to a certain level before other adverse consequences are experienced.

25 Consequently, a need exists for a modular zipper seal jaw unit that can be easily

removed from or installed on a prior art form and fill packaging machine sealing carriage, thereby quickly modifying the sealing carriage for a reclose configuration. This zipper seal jaw module should incorporate safety features to keep the operator away from heat sources and should physically lock in the closed position in order to avoid inadvertent closure of the device on the operator's hands during removal or installation. Ideally, the module should be self-aligning and quickly installable with a minimal number of tools. The module design should allow for a uniform application of pressure during the sealing mode between the jaw facings and the zipper seal facings. Further, the orientation of the module should allow for no interference with the form and fill machine chassis during stripping and promote increased stripping efficiency. A single module should be easily convertible to handle any width reclose bag without the need to stock and replace various sizes of zipper facings. The invention should also incorporate a standard return module that can be quickly and easily substituted for the reclose module to return the form and fill package machine to standard transverse seal operation.

SUMMARY OF THE INVENTION

The proposed invention comprises a quick-change zipper seal jaw module and accompanying return module that are self-aligning and easily installed in less than fifteen
5 minutes with a single standard tool. The zipper seal module uses two rigid support members to support an opposed pair of zipper seal facings and an opposed pair of jaw facings. The support members can also support crumb plates and stripper bars, as needed. Each support member is easily attached to an existing bridge assembly with one or more bolts. Each support member also has at least one threaded receiver for receiving a bolt from an aligning
10 tool. This aligning tool holds the opposed facings together in an aligned position when the module is being installed, removed, or while in storage. The heating requirements of the module are completely self-contained and connected to electrical quick-connect plugs which mate with quick-connect outlets installed on the chassis of the form and fill machine.

The zipper facings are located above the jaw facings in one embodiment of the
15 invention. This requires that the package film be run upside-down, but also increases stripping efficiency, since the thicker zipper seal is located further from the product level in the bag during sealing. Further, the zipper seal facings and jaw facings are oriented such that the pressure applied on the module by the bridge assemblies during a sealing step is generally distributed equally about all facing contact surfaces. A knife adapter is provided to move the
20 location of the knife to the repositioned jaw facings.

In one embodiment of the invention, the zipper seal facing is constructed of a slotted channel that allows for the installation of end inserts. This allows for the same zipper facing to be used to make varying widths of reclose bags by merely changing the size of the end inserts or moving the inserts relative to each other within the slotted channel.

25 The invention also provides for a "return" module which returns the vertical form,

fill, and seal machine to a standard transverse seal configuration using the same mounting hardware as used with the reclose or zipper seal module. The return module is also self-aligning by use of an alignment handle.

The invention is a great improvement over the prior art for a number of reasons. The time involved in changing a form and fill machine from a standard transverse seal configuration to a reclose configuration has been reduced from several hours to less than 15 minutes. A similar time saving is involved when adjusting the zipper seal facing of the invention for varying bag widths since the zipper seal facing need not be removed. This feature also saves a considerable amount of capital investment, since changing a reclose bag width does not require the use of a different, and expensive, size jaw facing.

The use of an aligning handle with both the reclose module and return module greatly increases safety during change-over operations and when required maintenance must be performed. Since the module is completely self-contained, maintenance on heat probes, thermosters, and other module components can be done off-line and away from the potential crushing hazards associated with working on sealing carriage components while the sealing carriage is in the open position. Changing facings can also be done off-line. The modular installation and removal using the aligning handle is done with the sealing carriage in the closed position, thereby keeping an operator away from hot components immediately after operation and reducing the chance of the facings inadvertently closing on an operator's hand.

The invention performs the sealing function more efficiently than prior art designs and increases stripping efficiency due to the reversed and centered relative orientation of the jaw facings and zipper seal facings. Normal dwell times and temperatures can be used while still producing uniform and acceptable transverse seals and zipper seals. The orientation of the facings centered on the bridge assembly also adds minimally to the vertical space required below the bridge assemblies to accommodate stripping travel. Therefore, the

modules do not interfere with an existing form and fill machine chassis during the stripping phase of package formation.

The above as well as additional features and advantages of the present invention will become apparent in the following written detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further
5 objectives and advantages thereof, will be best understood by reference to the following detailed description of illustrative embodiments when read in conjunction with the accompanying drawings, wherein:

Figure 1a is a perspective view in elevation of a prior art sealing carriage;

Figure 1b is a cross-section of a prior art facing assembly;

10 **Figure 2a** is a perspective representation of a food package incorporating a zipper seal;
Figure 2b is a cross-section of the top portion of a food package incorporating a zipper seal;

Figure 2c is a side view perspective view in elevation of a prior art modification to a sealing carriage to accommodate a reclose configuration;

15 **Figure 3a** is a cross-section of a prior art modification to a facing assembly to accommodate a reclose configuration;

Figure 4a is a perspective view in elevation of the reclose module of the present invention installed on a prior art sealing carriage;

Figure 4b is a cross-section of the reclose module of the present invention;

20 **Figure 5** is a perspective view in elevation of the reclose module of the present invention with an aligning handle installed;

Figure 6 is a perspective view in elevation of the aligning handle of the present invention;

Figure 7 is a perspective view in elevation of one embodiment of a zipper seal facing of the present invention;

25 **Figure 8** is a perspective view in elevation of the knife assembly of the present

invention;

Figure 9 is a cross-section view of the return module of the present invention; and

Figure 10 is a perspective view in elevation of the return module of the present invention with handles.

DETAILED DESCRIPTION

Figures 4a and 4b illustrate one preferred embodiment of the reclose module of the present invention. **Figure 4a** is a perspective view of the reclose module installed in a prior art sealing carriage, while **Figure 4b** is a cross-section of the reclose module in position on the bridge assemblies **406, 408** without the aligning handle installed, which handle will be described in further detail below.

The reclose module is self-contained comprising many of the individual components which together make up the prior art modification embodiment shown in **Figures 3a and 3b**.

With reference to **Figure 4b**, included within the reclose module are a pair of opposed jaw facings **402, 404**, a pair of opposed zipper seal facings **440, 442**, heat probes **428, 430, 444, 446**, thermosters **448, 450**, heat barriers **436, 438**, crumb plates **414, 416**, and stripper bars **418, 420**.

The module itself is mounted onto the sealing carriage at the bridge assemblies **406, 408** by four installation bolts **456, 460**, two of which are shown in the cross-sectional view of **Figure 4b**. Two nut wells **464, 466** visible on **Figure 4a** provide access to these bolts **460** and show the relative position of the bolts **460** along the length of a bridge assembly **408**. (**Figure 5** shows the two installation bolts **560, 562** that would be received by the nut wells **464, 466** shown on **Figure 4a**). Since installation of the entire module onto the bridge assemblies **406, 408** is accomplished by tightening four uniform nuts on four bolts **456, 460**, a single socket wrench is the only tool required in changing over from a return module (which will be described below) and the reclose module, and vice versa.

The relative vertical positioning of the facings pairs **402, 404, 440, 442** (the jaw facings **402, 404** and the zipper seal facings **440, 442** are both referred to by Applicants generically as “facings”) have been reversed in the preferred embodiment illustrated. The

zipper seal facings **440, 442** are now located above the jaw facings **402, 404**. This embodiment is preferred because it reduces the need to strip through the thicker zipper seal area on the bag. By reversing the facings **402, 404, 440, 442** relative to their vertical orientation, the zipper seal and the transverse seals can be made first before the bag is filled
5 from what will become the bottom of the bag. With the bag being filled inverted, the area most likely requiring stripping is the transverse seal area, since it is located closest to the product level in a filled bag. Consequently, the stripping gap can be set narrowly in order to efficiently strip this area. The only other adjustment required is that the packaging film must be run upside-down through the form and fill machine.

10 Another distinct advantage of the present invention over the prior art is the added rigidity of the module and the centering of the pressure transmitted to the facings **402, 404, 440, 442** by the force vectors **F** acting on the bridge assemblies **406, 408**. First, all of the various components that make up the reclose module are mounted on or supported by two support members **472, 474**. Each support member **472, 474** is extremely rigid and made from
15 a contiguous piece of metal or other suitable material such as hardened steel. The front support member **474** (referenced, like all other components referred to by Applicants as “front” or “rear,” from its position on the sealing carriage while viewed by an operator) is constructed to provide a snug fit about the front bridge assembly **408**. The rear support member **472** must have some tolerance in its fit with the rear bridge assembly **406** in order to
20 accommodate the auto-aligning feature of the invention which will be described below. Second, the zipper seal facings **440, 442** and jaw facings **402, 404** have also been re-oriented so that they are more centrally aligned with the force vectors **F** acting on the bridge assemblies **406, 408**. This alignment with the force vectors **F** combined with the rigidity provided by the design of the support members **472, 474** resolves the pressure loss problem
25 of prior art designs whereby the prior art zipper seal facings tend to deflect away from the

package film during sealing. Consequently, the present invention provides for an even distribution of pressure about the zipper facings **440, 442**, and the jaw facings **402, 404**. This in turn allows the form and fill machine to operate at shorter dwell times and standard temperatures.

5 As noted previously, prior art reclose facing assembly designs do not allow for removal of components from the bridge assemblies, as the alignment of the facing is factory set. Consequently, most repair work that must be done on the prior art facing assembly, such as the replacement of heat probes or thermosters, must take place with the prior art facing assembly installed on the bridge assemblies. This exposes the operator to many of the safety
10 hazards previously discussed. The present invention, however, provides for a self-aligning feature that is accomplished prior to installing the module on the bridge assemblies **406, 408**. Consequently, any maintenance that must be performed on the module components can be done safely off-line. This is accomplished by use of an aligning handle as illustrated in **Figures 5 and 6**.

15 **Figure 5** shows one embodiment of the aligning handle **576** installed on a reclose module. **Figure 6** shows the aligning handle **676** without the reclose module attached. The aligning handle **676** is constructed of a rigid material, such as hardened steel, and can be of a contiguous cast design, made up of several major components welded together, or made up of several major components bolted together. Importantly, the aligning handle has two front
20 engaging means **678, 680** and two rear engaging means **682, 684**. These engaging means **678, 680, 682, 684** in the embodiment illustrated comprise bolts with knobs at one end, but could be of any suitable design to rigidly attach the handle to modules.

 Returning to **Figure 5**, when the aligning handle is placed in the proper position in relation to the accompanying module, each of the four engaging means **578, 580, 582, 584**
25 secure the opposed sections of the reclose module by twisting the respective knobs, which in

turn causes the bolts **578, 580, 582, 584** to seat in threaded receivers (indicated by dashed lines **486, 488** on **Figure 4b**) located in the support members **572, 574**. These threaded receivers are located such that the zipper seal facings **540, 542** and jaw facings **502, 504** are aligned once the aligning handle **576** has been properly secured to the reclose module. The
5 entire reclose module can then be carried in one, self-contained package by the aligning handle **576**.

To install the reclose module, it is placed in between the bridge assemblies while the sealing carriage is in the open position. The bridge assemblies are then slowly closed such that the installation bolts **560, 562** are directed through the respective bolt and nut wells on
10 the receiving bridge assemblies.

By referring back to **Figure 4b**, it can be seen that the front support member **474** is now snugly fitted about the front bridge assembly **408**. Although shown apart in **Figure 4b**, at this stage the front and rear portions of the module would be held tightly together in an aligned position by the aligning handle. The rear support platform **472** allows for tolerance
15 about the rear bridge assembly **406** in order that this alignment can be maintained while the installation bolts **456, 460** are tightened with standard nuts (not shown). Once the nuts have been tightened on the installation bolts **456, 460**, the alignment handle is removed and the alignment of the module is thereafter maintained by the installation bolts **456, 460**.

Returning to **Figure 5**, also shown is an electrical quick connect plug **594**. This
20 electrical quick-connect plug **594** consolidates the wiring to various electrical components in the reclose module, such as the heat probes and thermosters. A receiving female outlet for this quick connect plug **594** can be installed on the modified form and fill machine chassis, thereby accommodating a quick and simple positive connection between the electrical control and inputs of the form and fill machine with the electrical components contained within the
25 reclosed module. Although **Figure 5** shows only one quick-connect plug **594**, an alternative

embodiment of the reclose module comprises two quick-connect plugs, each with a wire harness directed to electrical components associated with one half of the module. Such a two-plug embodiment would require two separate receiving outlets installed on the chassis of the form and fill machine. Additional electrical controls are added to the form and fill machine to separately control the electrical components associated with the zipper seal facings **540, 542**, and would be consolidated in the receiving outlets.

Returning to the installation of the invention's reclose module in a sealing carriage, and comparing **Figure 3b and Figure 4b**, it can be seen that the channels **341, 343, 441, 443** in the jaw facings **302, 304, 402, 404** that are designed to accommodate the knife are no longer in the same position relative to the bridge assemblies **306, 308, 406, 408**. The knife is not a component of the embodiment of the reclose module shown in **Figure 4b**, but, rather, remains attached to the bridge assembly **406, 408**. Consequently, it is necessary to provide another modification to the sealing carriage in order to account for the lower position of the invention's jaw facings **402, 404**. This is accomplished by knife adapters **801, 803** illustrated in **Figure 8**. When using the knife **822** with the reclose module, the knife adapters **801, 803** reposition the knife **822** relative to the lower positioned jaw facings **402, 404**.

The knife adapters **801, 803** comprise two extenders **805, 807** and two installation pins **809, 811**. The installation pins **809, 811** hold the knife **822** in the knife adapters **801, 803** by positioning the knife **822** in receiving slots **813, 815**, and passing the pins **809, 811** through a hole **817** in either end of the knife **822**.

The knife **422** is installed on the reclose module as illustrated in **Figure 4a** after the reclose module is installed on the bridge assemblies **406, 408**, as described above. The sealing carriage is then opened. The extensions **405, 407** are then fitted over the existing knife brackets **424, 426**. The knife **422** is inserted into the channel on the rear jaw facing **402**. The installation pins **409, 411** are next inserted through holes in the end of each knife

bracket **424, 426** and holes at the ends of the knife **422**. Likewise, the knife **422** can be removed by reversing the above sequence when the reclose module is removed from the sealing carriage.

The installation of the reclose module is completed once the support member
5 installation bolts have been installed on the bridge assemblies, the knife has been properly positioned and attached with the knife adapters, and the electrical quick-connects have been inserted into the receiving outlets on the form and fill machine chassis. The entire installation process takes a single tool, a standard socket wrench, and takes less than fifteen minutes.

10 The reclose module is removed by first opening the sealing carriage. The knife and knife adapters are removed and the electrical quick-connects are disconnected from the chassis. The ceiling carriage is then closed. Next, the aligning handle is attached to the support members as previously described. The nuts are then removed from the support member installation bolts. Finally, the sealing carriage is opened and the reclose module is
15 lifted therefrom by the aligning handle.

Figure 7 shows the rear zipper facing **740** for one embodiment of the present invention. This embodiment shows another novel feature of the invention which eliminates the need for the use of a different zipper seal facing for each different bag width run in the reclose configuration. This is accomplished by using a slotted channel **796** in combination
20 with two inserts **798, 799**. The inserts **798, 799** slide into and out of the channel, being held in place by the flange configuration of the edges of the channel and/or set screws (not shown). Rather than stocking various sizes of zipper facings having different widths of rectangular relief, different sized inserts **798, 799**, used to change the horizontal distance between the two inserts **798, 799**, can be kept in stock. Alternatively, a single size set of
25 inserts **798, 799** can be used and simply moved horizontally along the channel **796** in order to

adjust for the appropriate bag width. The inserts **798, 799** themselves can have teeth on their exposed contact surface (as shown), have a flat contact surface, or any other appropriate design.

Changing the bag width for a reclose configuration using this feature of the present invention is a relatively simple task. The reclose module is removed from the bridge assembly, as previously described. The operator next removes the reclose module to a work bench or similar area. The aligning handle is removed to allow access to the rear zipper facing **740**. Inserts **798, 799** are then removed and replaced with new inserts **798, 799** sized for the bag width to be run. Alternatively, the inserts **798, 799** are repositioned along the channel in order to adjust the distance separating them for the new bag width required. Removal of the entire zipper facing **740** is not required. The reclose module can then be realigned and reinstalled as previously described.

The embodiment of the invention's reclose module illustrated in **Figure 4b** shows a rear zipper seal facing **440** with an insert **498** in the slotted channel, while the opposed front zipper seal **442** comprises a flat exposed surface. (This is also evident in **Figure 5**.) An alternative embodiment of the invention comprises slotted channels in both the rear zipper facings **440** and the front zipper facings **442**.

In order to convert the modified form and fill machine of the present invention back to a standard (no zipper seal facings) configuration, the present invention utilizes what is called a "return" module, which returns the form and fill machine to the standard transverse seal operation. One embodiment of the return module of the present invention is shown in **Figure 9**. The return module shown comprises opposed jaw facings **902, 904**, support members **972, 974**, heat probes **928, 930**, thermosters **932, 934**, crumb plates **914, 916**, stripper bars **918, 920**, and thermal barriers **936, 938**. The support members **972, 974** are smaller than the support members used in the reclose module, but perform much the same

function of maintaining a rigid support base for all of the various components that comprise the return module.

The return module is installed on the bridge assemblies **906, 908** in a manner similar to that previously described with regard to the reclose module. Specifically, it is attached to
5 the bridge assemblies **906, 908** by four bolts **956, 960** connected to the support members **972, 974**. Since the jaw facings **902, 904** are in the same relative vertical positions as in a prior art facing assembly, a knife adapter, such as the one shown in **Figure 8**, is not required for the return module.

The return module is aligned, stored, and transported using the invention's aligning
10 handle **676**, as is illustrated in **Figure 6**. **Figure 10** shows the aligning handle **1076** installed on the return module. As with the reclose module, the return module is also equipped with one or more electrical quick disconnect **1094** electrical connections in order to connect the various electrical components of the return module to the modified form and fill machine controls. The installation of the reclose module is completed after the quick disconnect **1094**
15 is mated with a respective plug on the chassis of the form and fill machine and the aligning handle **1076** is removed. The return module then functions just as the prior art facing assembly described in relation to **Figure 1b**.

The return module is easily installed in place of the reclose module on the modified form and fill machine of the present invention. Installation or removal of either module takes
20 less than fifteen minutes, can be accomplished with a single standard socket wrench, and minimizes the operator's exposure to hot components and time spent with digits exposed while the sealing carriage is in the open position.

While the invention has been particularly shown and described with reference to a preferred embodiment, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention.

CLAIMS:

What is claimed is:

1. A reclose module for installation on the bridge assemblies of a sealing carriage, said module comprising:

two support members;

two opposed zipper seal facings, each attached to a respective support

5 member;

two opposed jaw facings, each attached to a respective support member below said zipper seal facings; and

wherein, when the support members are installed on said bridge assemblies, the zipper seal facings and jaw facings are located approximately equidistant from the
10 axis of the force vectors transmitted from the bridge assemblies to the support members during sealing operations.

2. The reclose module of claim 1 further comprising:

aligning handles attachable to said support members when the module is in a closed position.

3. The reclose module of claim 1 wherein at least one of the zipper seal facings comprises a slotted channel.

4. The reclose module of claim 1 further comprising:

two crumb plates, each attached to a respective support member.

5. The reclose module of claim 1 further comprising:

two stripper bars, each attached to a respective support member.

6. The reclose module of claim 1 further comprising:

a heat probe in contact with at least one jaw facing;

a heat probe in contact with at least one zipper seal facing;

wires connected to each of said heat probes; and

- 5 at least one electrical quick-connect for connecting said heat probes to controls on a form and fill machine.

7. The reclose module of claim 1 further comprising:

a knife adapter attached to one bridge assembly for orienting a knife to a jaw facing.

8. A modified sealing carriage on a form, fill, and seal machine having two opposed bridge assemblies, said modified sealing carriage comprising:
- two support members, each one removably affixed to a respective bridge assembly;
 - 5 at least one facing attached to each support member;
 - at least one heat probe enclosed between said at least one facing and each respective support member; and
 - an aligning handle attachable to each support member when said facings are placed in proximate contact.
9. The modified sealing carriage of claim 8 wherein the support members, heat probes, and facings form a single removable module when the aligning handle is attached to each support member.
10. The modified sealing carriage of claim 9 further comprising:
- electrical quick-connect means for connecting electrical components of said single removable module to said form and fill machine.
11. The modified sealing carriage of claim 8 wherein a jaw facing and a zipper seal facing are attached to each support member.
12. The modified sealing carriage of claim 11 wherein each zipper seal facing is positioned above each jaw facing.

13. The modified sealing carriage of claim 11 wherein the jaw facings and zipper seal facings are oriented on said support member such that relatively uniform pressure is distributed about all said facings when the sealing carriage presses the opposed facings together.
14. The modified sealing carriage of claim 11 wherein at least one zipper seal facing comprises:
 - a slotted channel for receiving inserts at each end, thereby providing a means for varying the width of the slotted channel.
15. The modified sealing carriage of claim 11 further comprising:
 - a knife adapter for repositioning a knife assembly attached to a bridge assembly relative to one jaw facing;
16. The modified sealing carriage of claim 15 wherein said knife adapter comprises:
 - two extension members attached to a said bridge assembly;
 - two attaching pins, each insertable through an extension member and knife blade.
17. The modified sealing carriage of claim 8 further comprising:
 - a crumb plate attached to each said support member.
18. The modified sealing carriage of claim 8 further comprising:
 - a stripper bar attached to each said support member.

19. A seal module for quick installation on the bridge assemblies of a sealing carriage of a form and fill machine, said seal module comprising
- at least one set of opposed facings;
- an aligning handle for aligning said opposed facings prior to installation on
- 5 said sealing carriage; and
- a plurality of attaching bolts for securing said at least one set of opposed facings on the bridge assemblies.
20. The seal module of claim 19 wherein an opposed set of jaw facings is positioned below an opposed set of zipper seal facings.
21. The seal module of claim 20 wherein said jaw facings and zipper seal facings are approximately equidistant from the axis of the closing force vectors acting on said bridge assemblies when the module is installed on said bridge assemblies.
22. The seal module of claim 20 wherein at least one zipper seal facing comprises a slotted channel and at least two end inserts.
23. The seal module of claim 19 further comprising at least one heat probe in contact with each jaw facing.
24. The seal module of claim 23 further comprising at least one electrical quick connect for connecting said heat probes to the form and fill machine electrical controls.

25. The seal module of claim 19 further comprising:
at least one set of crumb plates connected to said facings.

26. The seal module of claim 19 further comprising:
at least one set of stripper bars connected to said facings.

27. A reclose module for a vertical form, fill, and seal machine having a pair of bridge assemblies, said reclose module comprising:

two support members, each having at least one threaded receiver for receiving a bolt and each having at least one bolt for mounting said support members on a
5 respective bridge assembly;

a pair of opposed zipper seal facings, each attached to a respective support member;

a pair of opposed jaw facings, each attached to a respective support member;
and,

10 an aligning handle having a plurality of attaching bolts, wherein said attaching bolts are threadable into said threaded receivers when said opposed facings are in proximate contact.

28. The reclose module of claim 27 wherein the pair of opposed zipper seal facings are located above the pair of opposed jaw facings when the support members are installed on their respective bridge assemblies.

29. The reclose module of claim 27 wherein the opposed zipper seal facings and opposed jaw facings are oriented relative to the bridge assemblies when the support members are attached to said bridge assemblies such that the pressure applied by the bridge assemblies when closing is generally equal between the opposed zipper seal facings
5 and opposed jaw facings.

30. The reclose module of claim 27 further comprising:
at least one heat probe mounted between at least one facing and at least one respective support member.
31. The reclose module of claim 30 further comprising:
electrical wires connected to said at least one heat probe;
an electrical quick-connect plug attached to said wires.
32. The reclose module of claim 27 further comprising:
a pair of crumb plates, each plate attached to a respective support member.
33. The reclose module of claim 27 further comprising:
a pair of stripper bars, each bar attached to a respective support member.

34. An improvement to a facing assembly having one pair of opposed jaw facings and one pair of opposed zipper seal facings, said improvements comprising:
- placing the pair of opposed zipper seal facings above the pair of opposed jaw facings when said facing assembly is installed in a sealing carriage.
35. The improved facing assembly of claim 34 wherein at least one zipper seal facing comprises:
- a slotted channel for receiving end inserts.
36. The improved facing assembly of claim 34 wherein the zipper seal facings and jaw facings are oriented approximately equidistant from the axis of the force vectors acting on the assembly when the assembly is in the closed and sealing position.
37. The improved facing assembly of claim 36 further comprising a means for repositioning a knife relative to one jaw facing.
38. The improved facing assembly of claim 34 wherein the facing assembly is removable from a sealing carriage as a single unit by installation of an aligning handle which aligns opposed pairs of facings.

39. An improvement to a facing assembly having one pair of opposed jaw facings and one pair of opposed zipper seal facings, said improvements comprising:

orienting the zipper seal facings and jaw facings approximately equidistant from the axis of the force vectors acting on the assembly when the assembly is in the closed and sealing position.

5

40. The improved assembly of claim 39 wherein at least one zipper seal facing comprises:

a slotted channel for receiving end inserts.

41. The improved facing assembly of claim 39 wherein the pair of opposed zipper seal facings are above the pair of opposed jaw facings when said facing assembly is installed in a sealing carriage.

42. The improved facing assembly of claim 39 further comprising a means for repositioning a knife relative to one jaw facing.

43. The improved facing assembly of claim 39 wherein the facing assembly is removable from a sealing carriage as a single unit by installation of an aligning handle which aligns opposed pairs of facings.

44. An improvement to a facing assembly having one pair of opposed jaw facings and one pair of opposed zipper seal facings, said improvements comprising:
 - a slotted channel for receiving end inserts on at least one zipper seal facing.
45. The improved facing assembly of claim 44 wherein the pair of opposed zipper seal facings are above the pair of opposed jaw facings when said facing assembly is installed in a sealing carriage.
46. The improved facing assembly of claim 44 wherein the zipper seal facings and jaw facings are oriented approximately equidistant from the axis of the force vectors acting on the assembly when the assembly is in the closed and sealing position.
47. The improved facing assembly of claim 44 further comprising a means for repositioning a knife relative to one jaw facing.
48. The improved facing assembly of claim 44 wherein the facing assembly is removable from a sealing carriage as a single unit by installation of an aligning handle which aligns opposed pairs of facings.

49. A zipper seal facing comprising:
 - a slotted channel for receiving end inserts.

50. The zipper seal facing of claim 49 further comprising:
 - two end inserts, one each installed at opposite ends of said zipper seal facing within said slotted channel.

51. An alignment handle for use with a seal module having a plurality of facings and a plurality of threaded receivers, said alignment handle comprising:
- a plurality of bolts, each threadable into a respective threaded receiver on said seal module, thereby securing said aligning handle to said seal module.
52. The aligning handle of claim 51 wherein the seal module facings are aligned when said aligning handle is secured to said seal module.

53. A method for manufacturing a reclose bag with a vertical form, fill, and seal machine, said method comprising the steps of:

(a) inverting the packaging film prior to the introduction of said packaging film into the form and fill machine, such that the packaging film is upside-down as it approaches a sealing carriage;

(b) forming said packaging film into a tube;

(c) sealing a zipper seal to the inside of the film tube while simultaneously forming a transverse seal below said zipper seal;

(d) moving downward the thus formed seals an approximate bag length;

(e) introducing product into the film tube;

(f) sealing said film tube above the product level by sealing a zipper seal to the inside of the film tube while simultaneously forming a transverse seal below said zipper seal;

(g) cutting the transverse seal above the product level, thereby completing the formation of a single reclose bag filled with product.

54. The method of claim 53 wherein the pressure applied by the form and fill machine during the sealing steps (c) and (f) is generally uniform about the contact surface of the film tube.

55. A method for installing a reclose module on a form and fill machine, said reclose module comprising a pair of opposed support members, each support member having a plurality of installation bolts and each support member attached to at least one facing, said method comprising the steps of:

- 5 (a) attaching an aligning handle to said support members such that said facings are aligned;
- (b) placing the reclose module between two bridge assemblies of a sealing carriage;
- (c) closing said sealing carriage such that the installation bolts of the support members are inserted through the bridge assemblies;
- 10 (d) attaching each support member to a respective bridge assembly by threading a nut on each installation bolt; and
- (e) removing the aligning handle from said support members.

56. The method of claim 55 further comprising the step of:

- (f) attaching knife adapters to said bridge assembly, thereby orienting a knife to one facing.

57. The method of claim 55 further comprising the steps of:

- (f) electrically connecting electrical components of the reclose module to electrical controls of the form and fill machine at least one electrical quick-connect.

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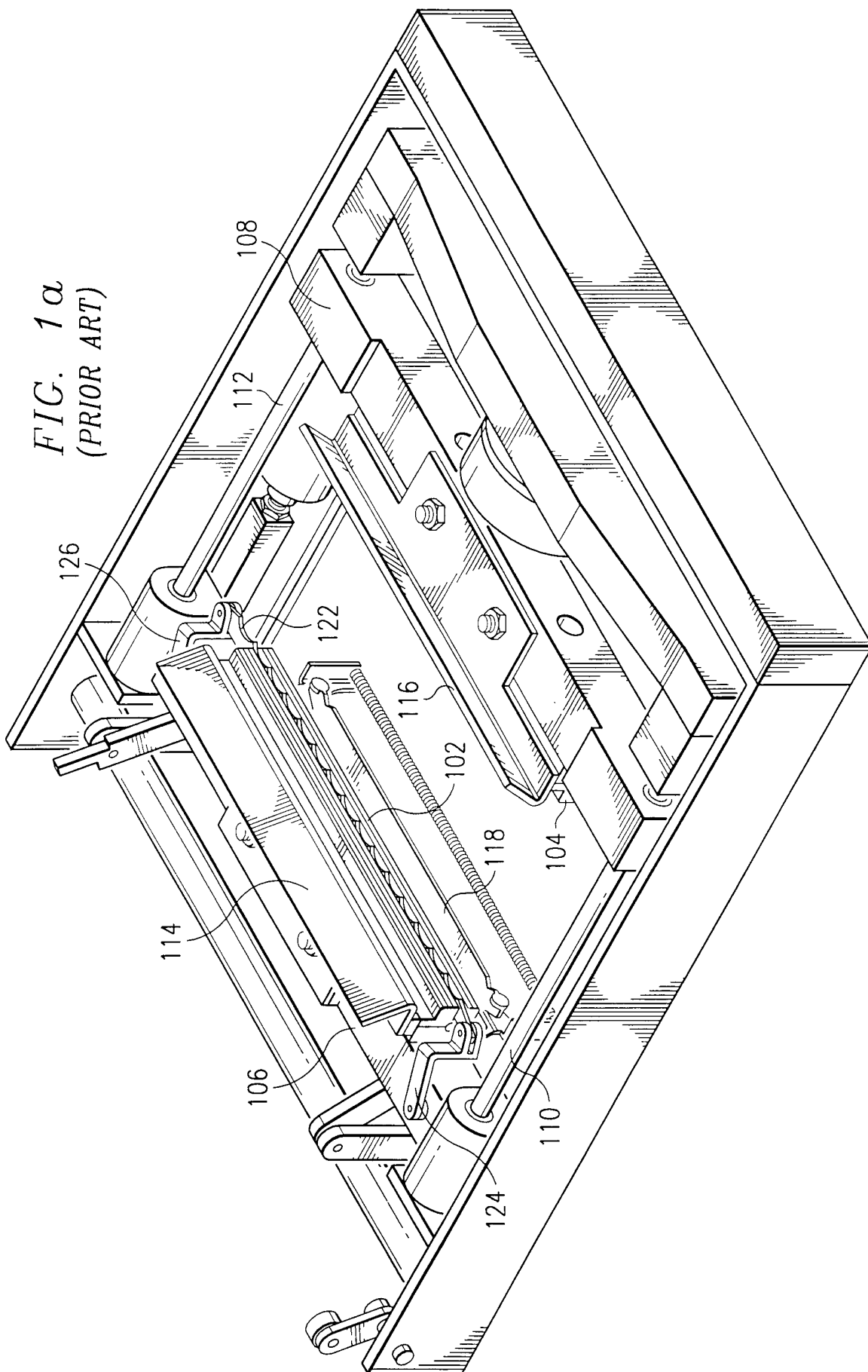
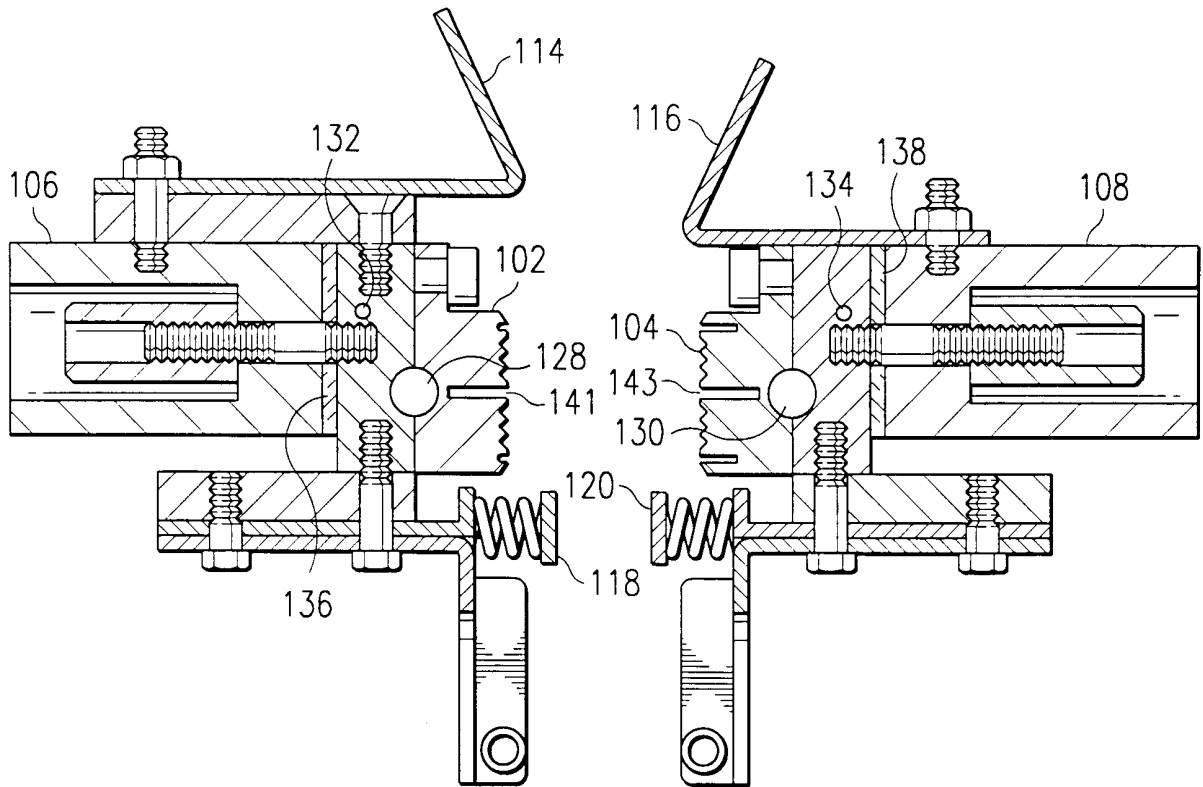


FIG. 1α
(PRIOR ART)

FIG. 1b
(PRIOR ART)



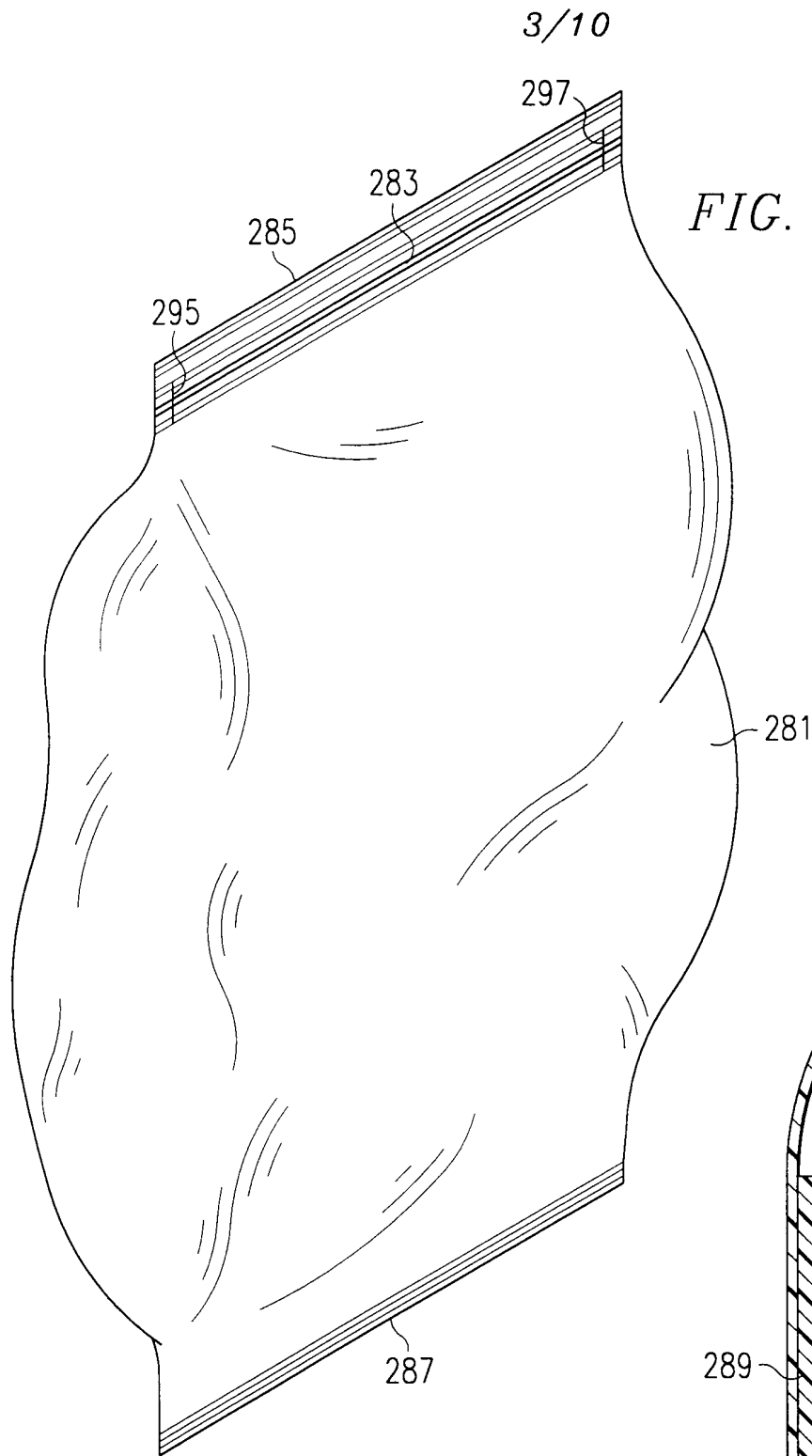


FIG. 2a

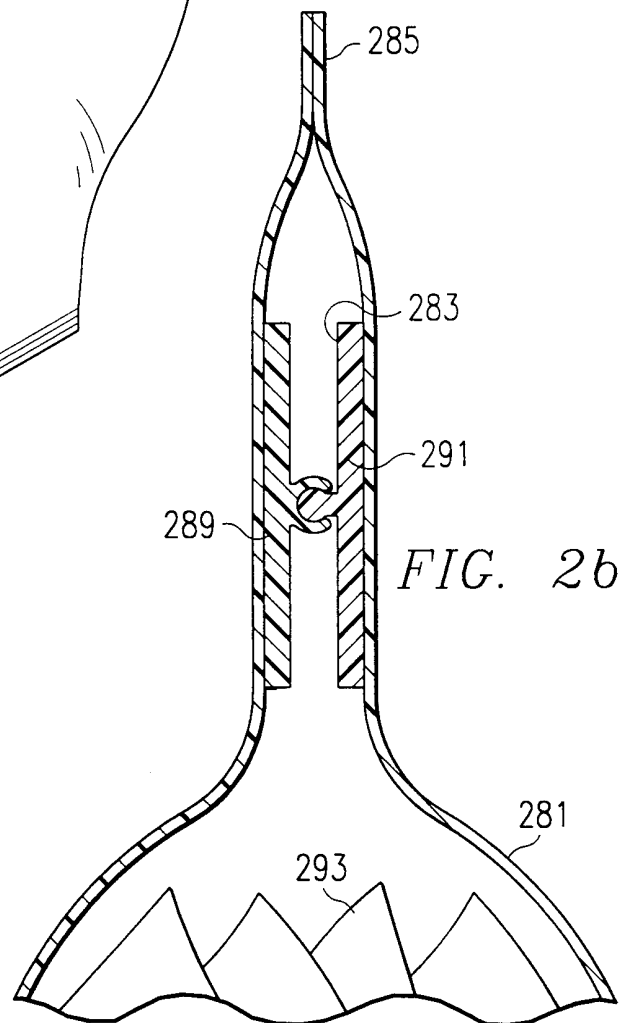


FIG. 2b

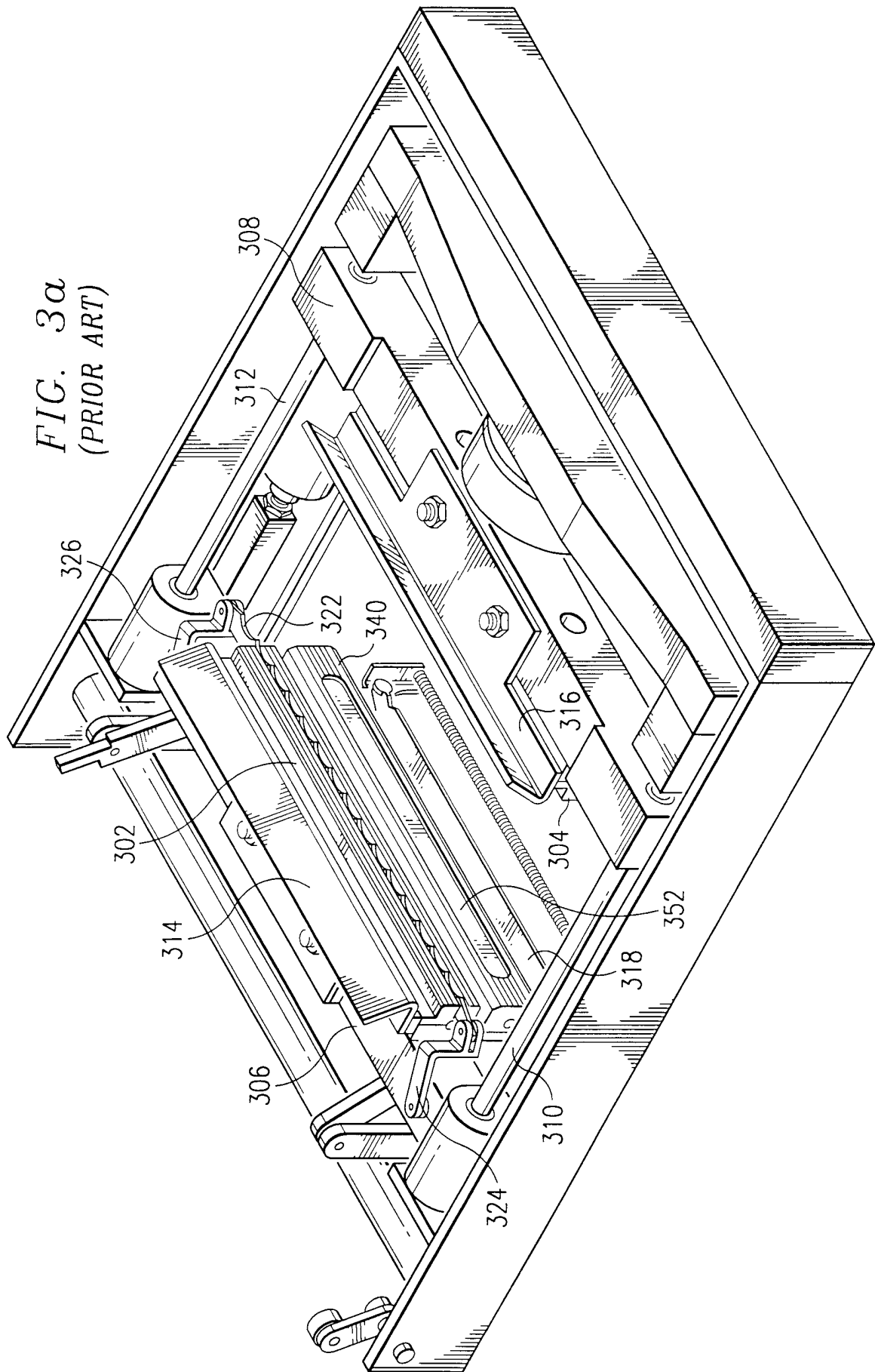
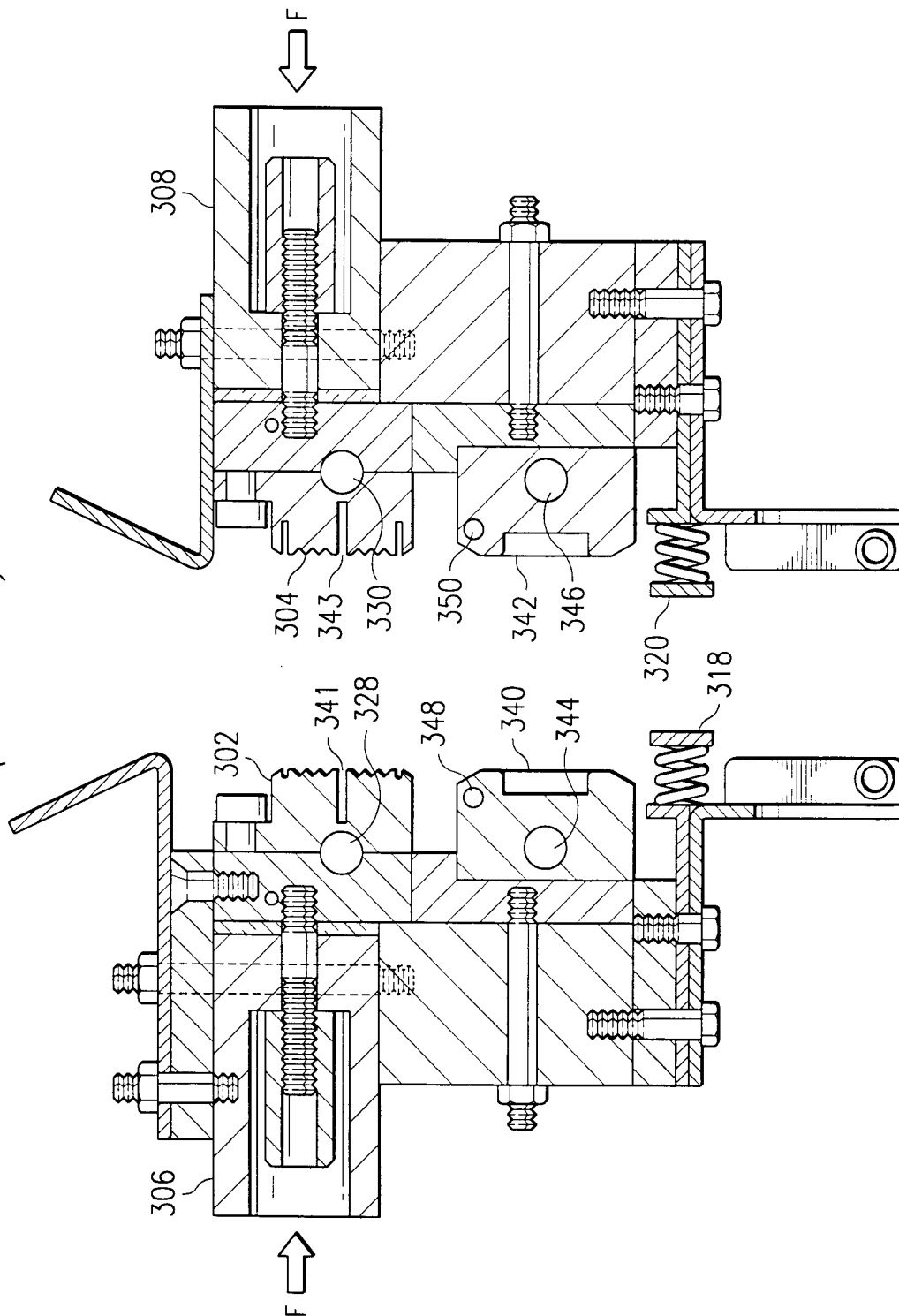


FIG. 3a
(PRIOR ART)

FIG. 3b
(PRIOR ART)



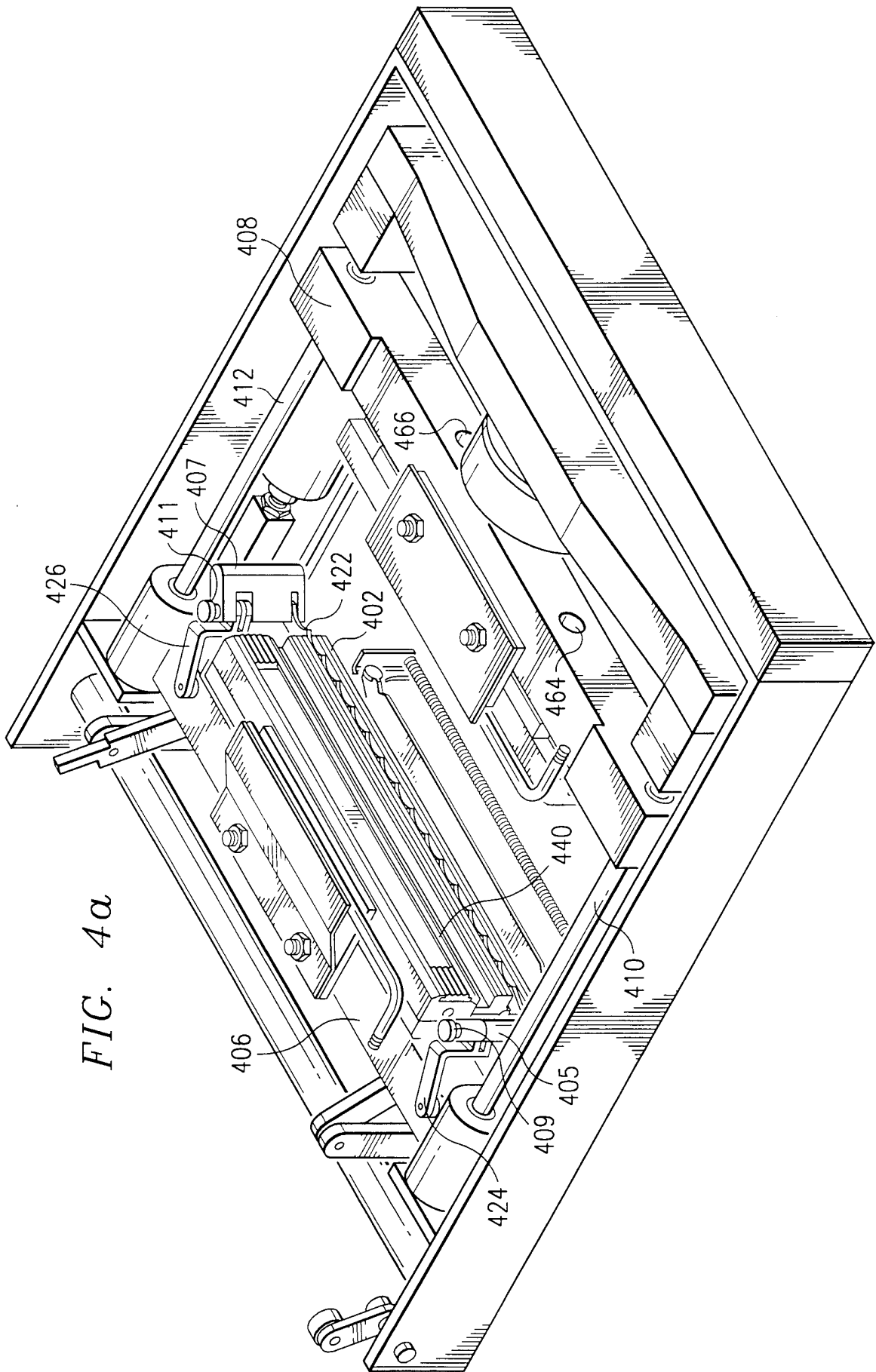
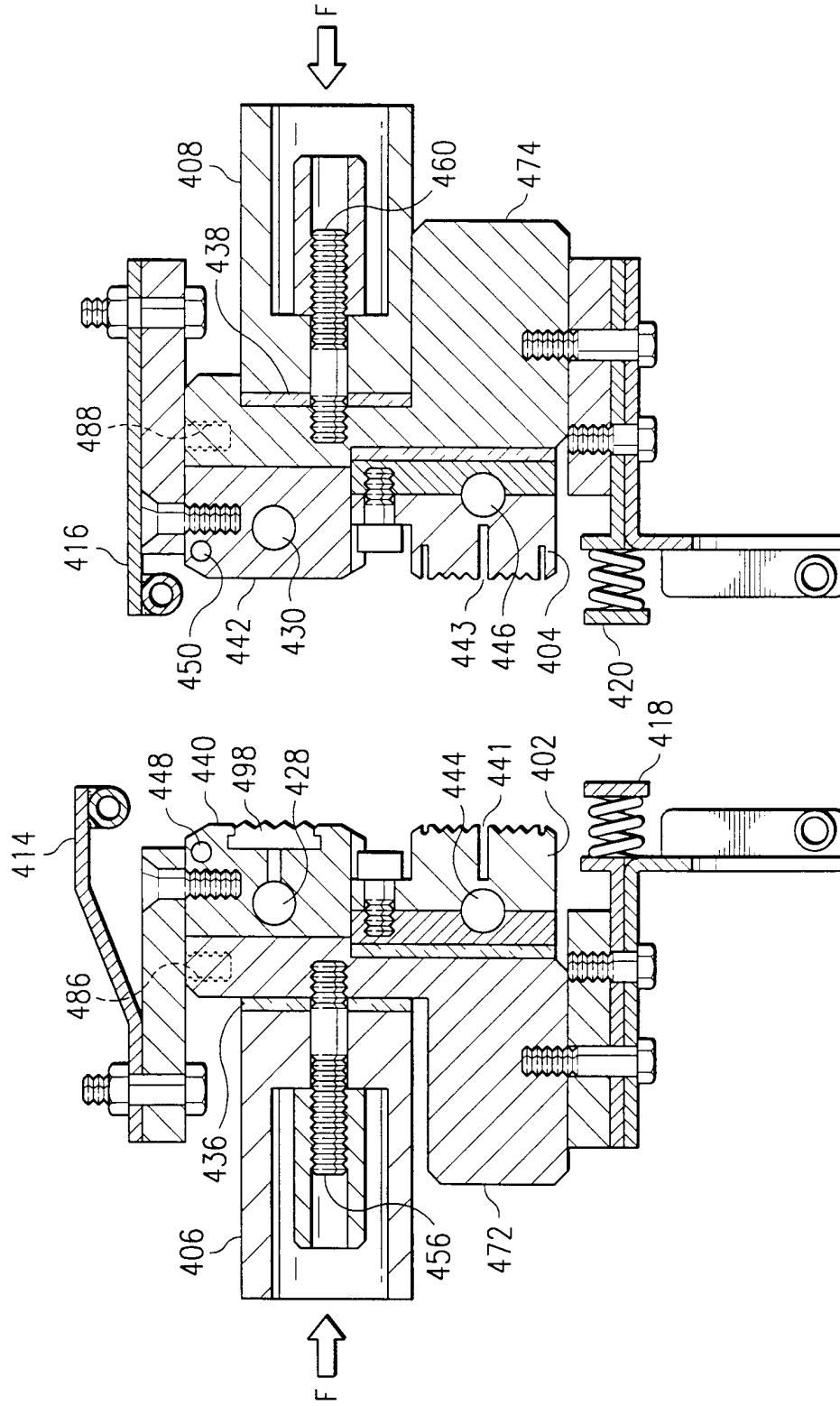
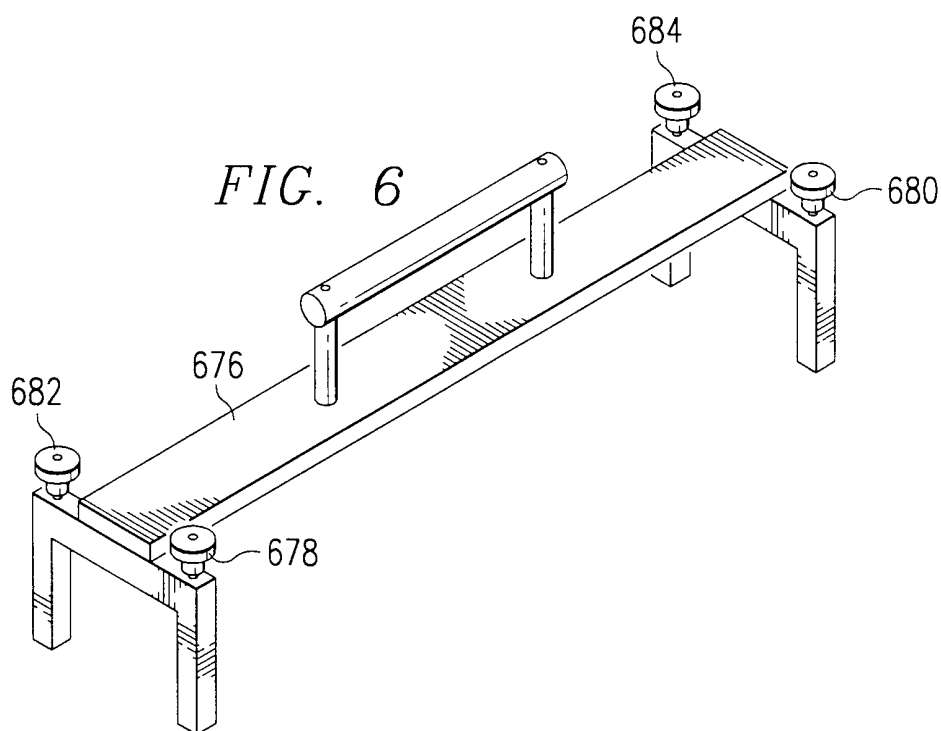
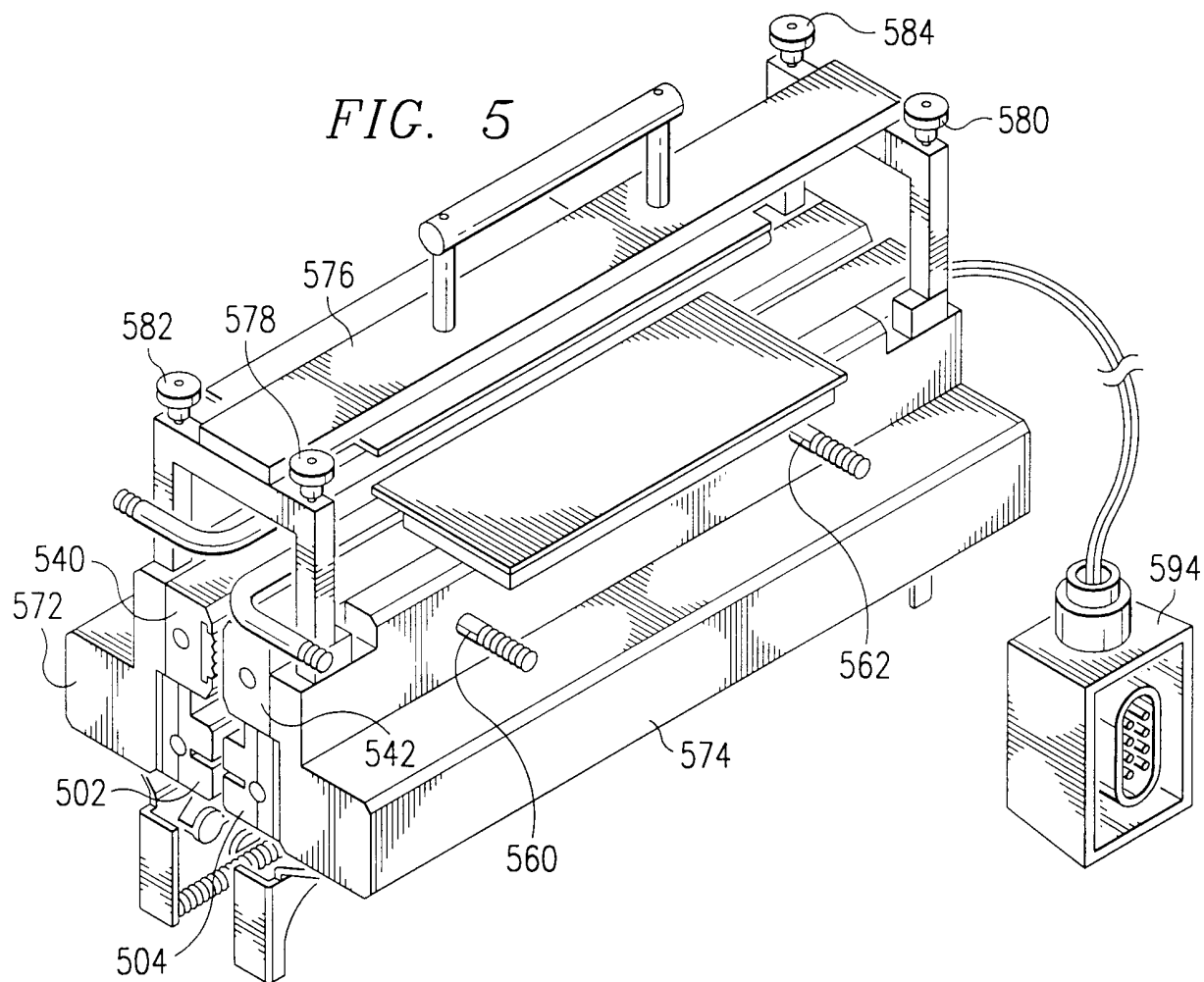


FIG. 4a

FIG. 4b





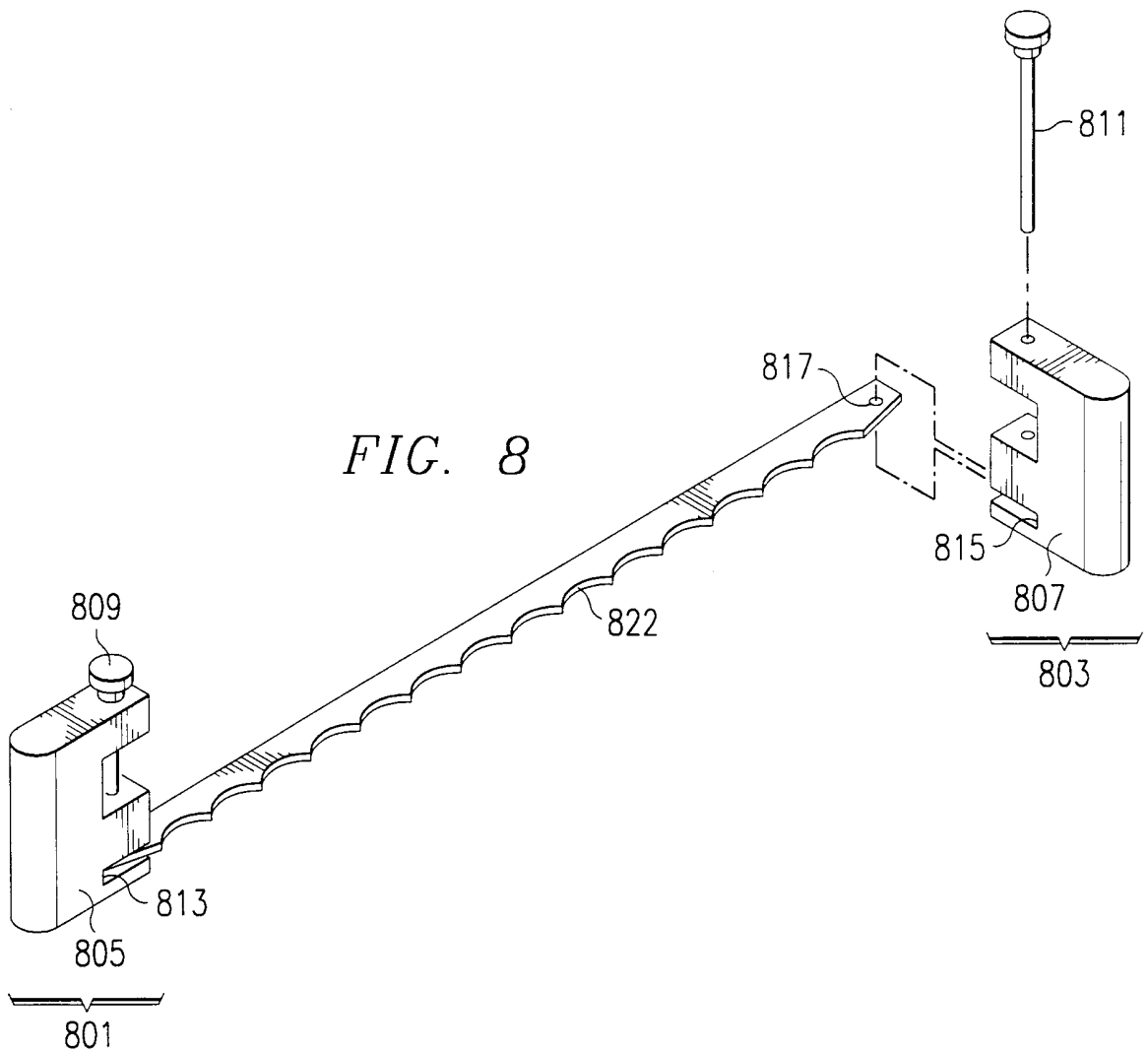
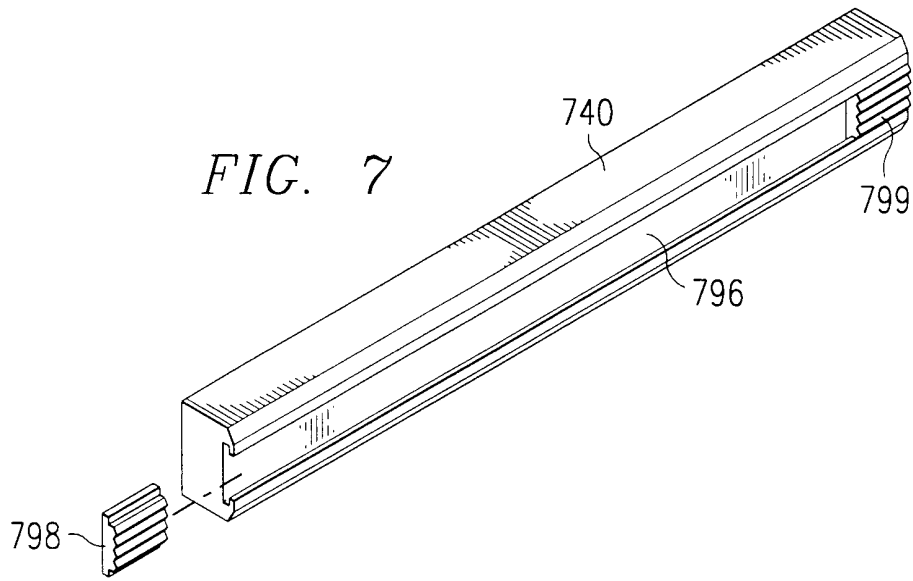


FIG. 9

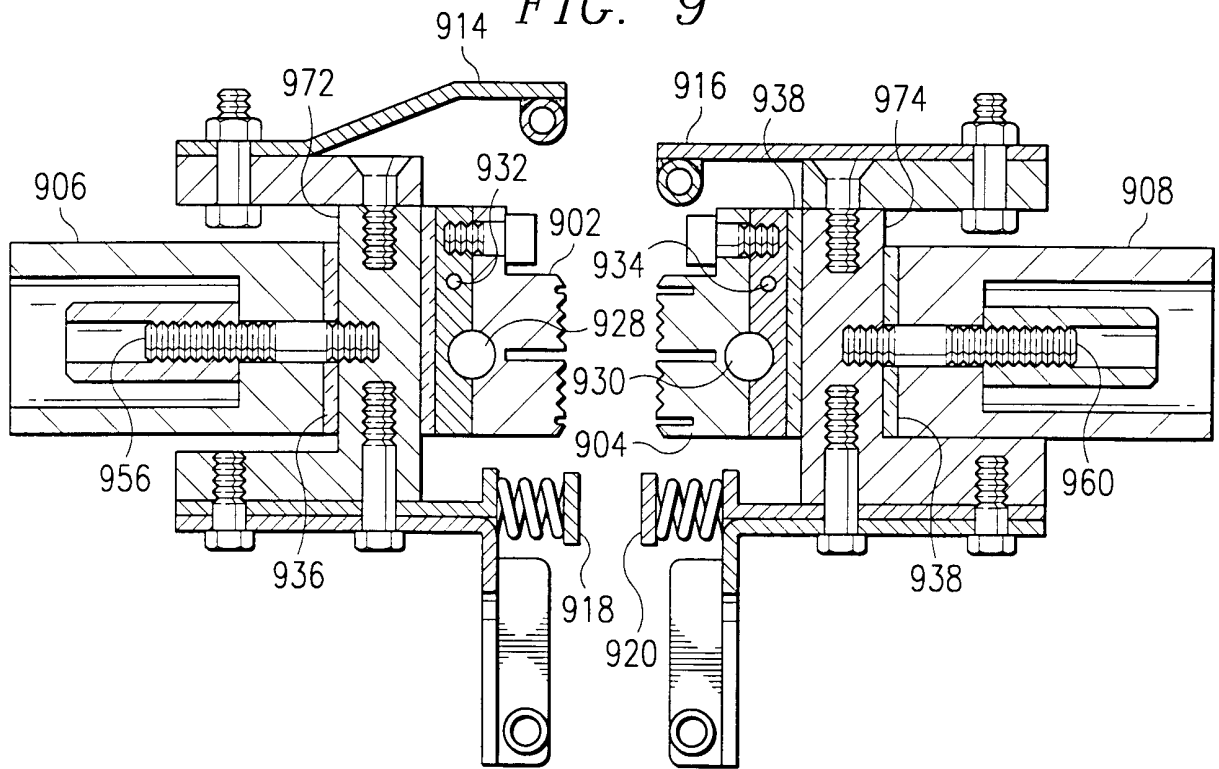
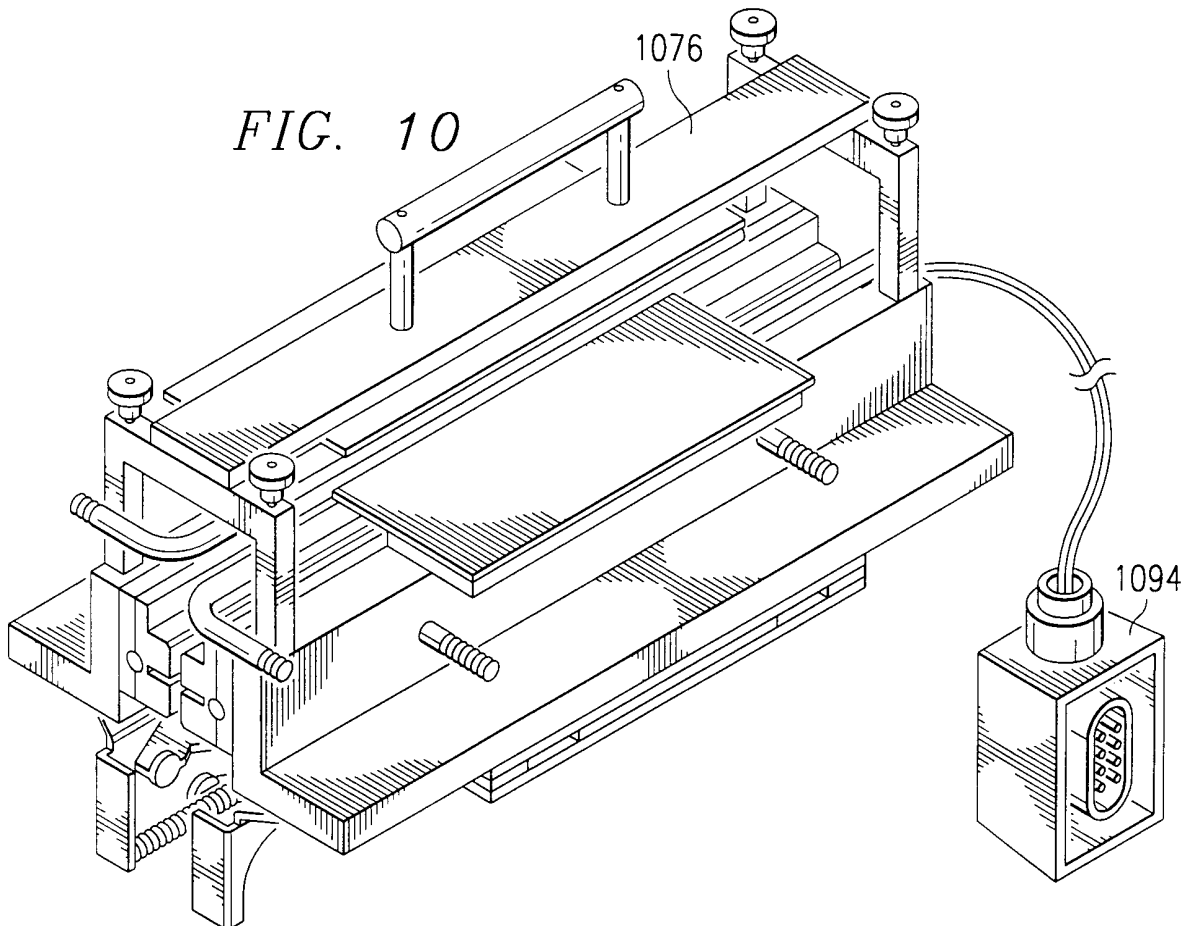



FIG. 10



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/23217

A. CLASSIFICATION OF SUBJECT MATTER		
IPC(7) : B65B 61/18		
US CL : 53/412,451,479,133.4,139.2,201,373.7,552; 16/422; 29/278,426.1; 493/209,213,927		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) U.S. : 53/412,451,479,133.4,139.2,201,373.7,553,554; 16/422; 29/278,426.1; 493/209,213,214,475,927; 156/66; 483/13		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,000,197 A (AUSNIT) 14 December 1999, see entire document	1-52 and 55-57
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X		53 and 54
Y	US 5,592,802 A (MALIN et al) 14 January 1997, see entire document	1-52 and 55-57
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X		53 and 54
Y	US 5,511,363 A (DOEDE) 30 April 1996, see column 7, lines 7-15 and line 52 et seq.	3, 14, 22, 35, 40, 44-50
Y	US 5,284,002 A (FOWLER et al) 08 February 1994, see Figure 12	3, 14, 22, 35, 40, 44-49
Y	US 5,016,426 A (DAVIS) 21 May 1991, see entire document.	3, 14, 22, 35, 40, 44-49
Y	US 3,438,173 A (OMORI) 15 April 1969, see Figures 5 and 7.	3, 14, 22, 35, 40, 44-49
Y	US 4,485,549 A (BROLUND) 04 December 1984, see entire document.	2, 8-33, 38, 43, 48, 51, 52 and 55-57
Y	US 3,678,562 A (LEIBINGER) 25 July 1972, see entire document.	2, 8-33, 38, 43, 48, 51, 52 and 55-57
Y	US 1,529,518 A (VOELLER) 10 March 1925, see entire document.	2, 8-33, 38, 43, 48, 51, 52 and 55-57
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
*	Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier application or patent published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means	
"P"	document published prior to the international filing date but later than the priority date claimed	
Date of the actual completion of the international search		Date of mailing of the international search report
30 November 2000 (30.11.2000)		28 DEC 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230		Authorized officer Peter Vo Telephone No. 308-1148
		 Sheila Vence Paralegal Specialist Technology Center 3700

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/23217

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
Y	US 4,353,196 A (BEER et al) 12 October 1982, see entire document.	13,21,29,36,39-43 and 46
Y	US 3,874,976 A (MACFARLAND, Jr.) 01 April 1975, see entire document.	13,21,29,36,39-43 and 46
Y	US 3,538,676 A (RUNO et al) 10 November 1970, see entire document.	13,21,29,36,39-43 and 46
Y	US 2,999,532 A (BURSAK) 12 September 1961, see entire document.	13,21,29,36,39-43 and 46
A	US 5,816,018 A (BOIS) 06 October 1998, see entire document.	1-57
A	US 5,768,852 A (TERMINELLA et al) 23 June 1998, see entire document.	1-57
A	US 5,519,982 A (HERBER et al) 28 May 1996, see entire document.	1-57
A	US 5,111,643 A (HOBCK) 12 May 1992, see entire document.	1-57
Y	US 4,909,017 A (McMahon) 20 March 1990, see entire document.	1-7 and 34-38

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/23217

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/23217

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-7 and 34-43, drawn to a reclose module.

Group II, claim(s) 8-18, drawn to a sealing carriage.

Group III, claim(s) 19-33, 51 and 52, drawn to seal module.

Group IV, claim(s) 44-48, drawn to a facing assembly.

Group V, claim(s) 49 & 50, drawn to a zipper seal.

Group VI, claim(s) 53 & 54, drawn to method of making and filling bags.

Group VII, claim(s) 55-57, drawn to a method of installing a reclose module.

The inventions listed as Groups I-VIII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Group I claims the feature of zipper facings above jaw facings and which are equidistant from the force axis; Group II claims a sealing carriage with a heat probe; Group III claims a seal module with handle and attaching bolts; Group IV claims jaw facings with a channel; Group V claims a zipper seal; Group VI claims the method of making and filling bags; and Group VII claims the method of installing a module in a packaging machine. None of the groups as divided above recite the special technical features set forth in the other groups.