United States Patent

Uline

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[54] MACHINE FOR FILLING PREFORMED POUCHES

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[73] Assignee: **Union Carbide Corporation**, New York, N.Y.

[22] Filed: **July 6, 1970**

[21] Appl. No.: **52,483**

[52] **U.S. Cl.** ..... **53/183**, 53/187, 198/33 AB

[51] **Int. Cl.** **B65b 5/08**

[58] **Field of Search** ..... 53/52, 183, 187; 198/33 AB

[56] **References Cited**

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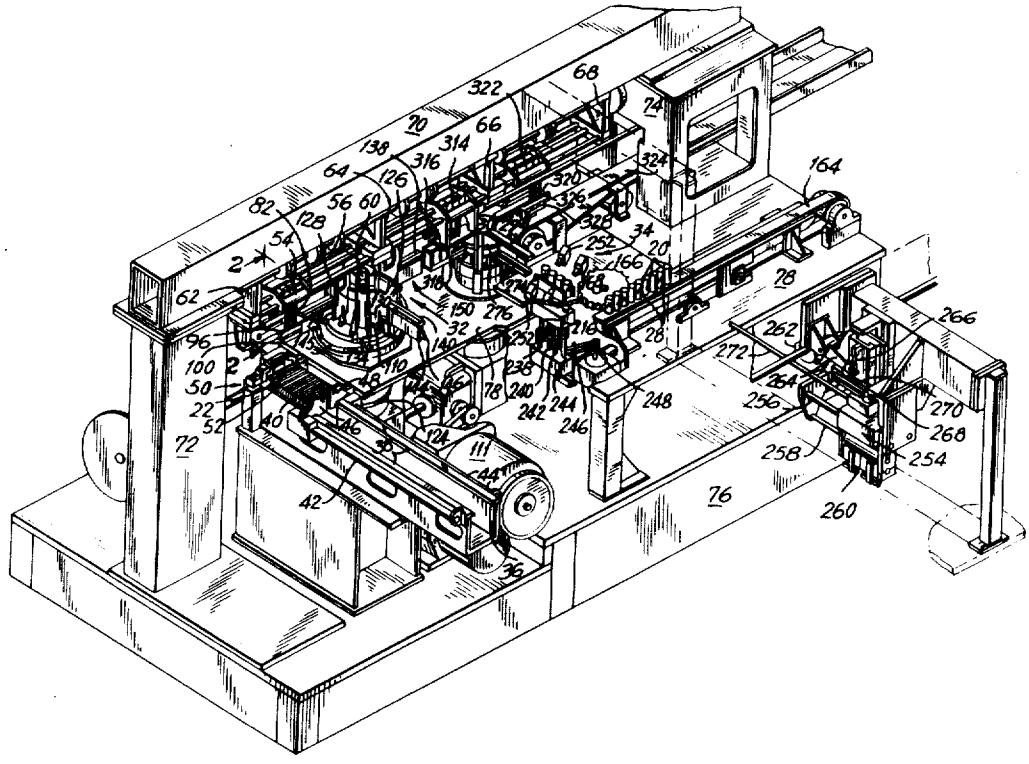
Primary Examiner—Travis S. McGehee

Attorney—Paul A. Rose, John F. Hohmann, John R. Doherty and Michael A. Caputo

[57] **ABSTRACT**

A machine for filling preformed pouches with a plurality of articles in a manner such that the relative position of the articles to each other and to the pouch is preserved during handling. The resulting packages are attractive and protect the packaged articles. Two rotating carousels are provided, one for pouches and the other for the articles to be packaged, with appropriate transfer mechanisms for delivering pouches to the first carousel, delivering articles to be packaged to the second carousel, transferring pouches from the first carousel to the articles of the second carousel, and transferring pouches with articles contained therein from the second carousel at an appropriate discharge station. Means are also provided for orienting the articles prior to packaging in a manner such that indicia contained on the labels of the articles are oriented to face in a predetermined desired direction.

14 Claims, 14 Drawing Figures



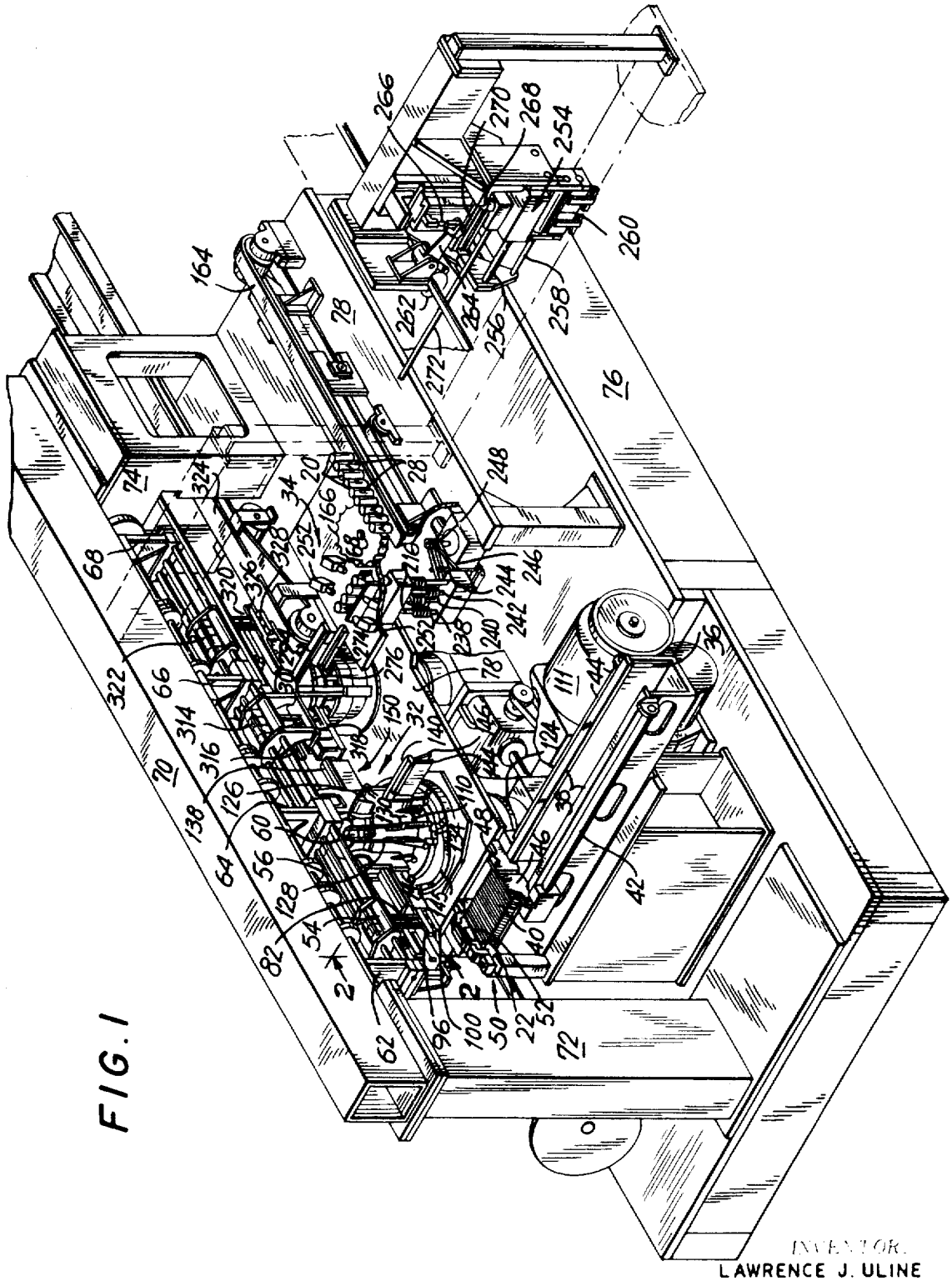


FIG. 1

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FIG. 3

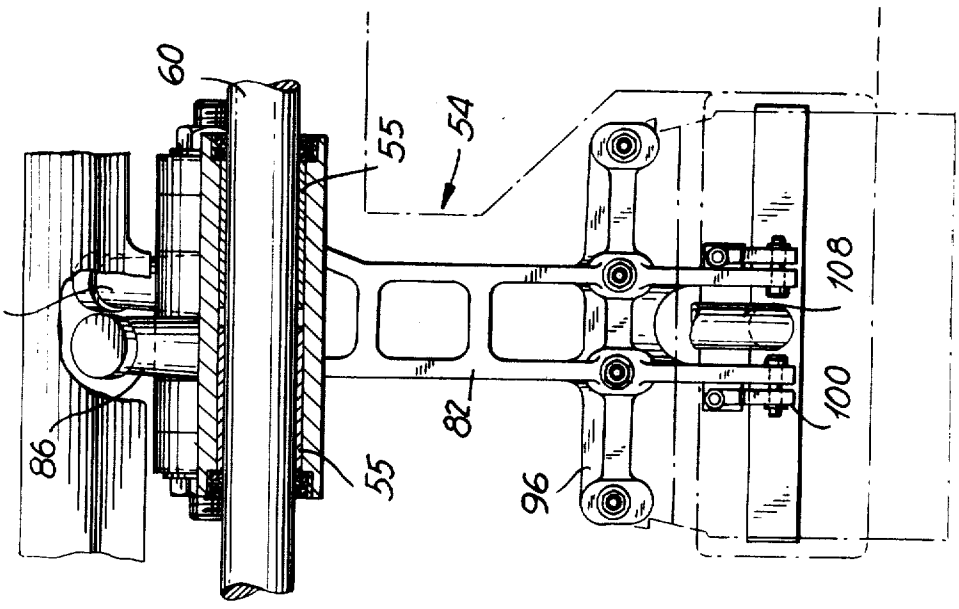

FIG. 2

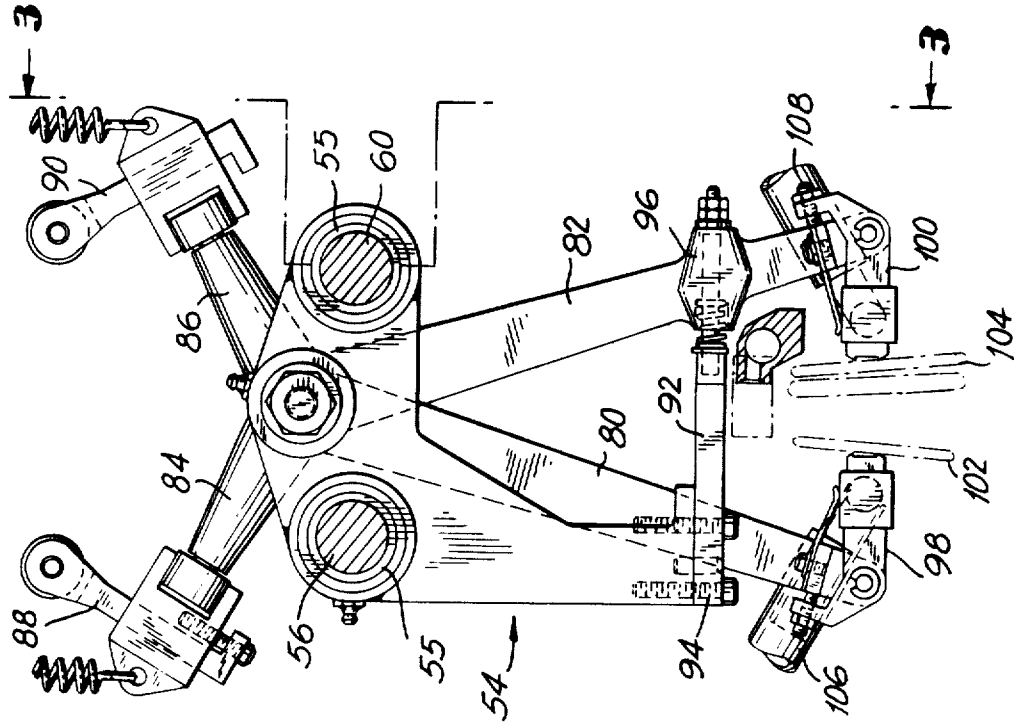

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FIG. 4

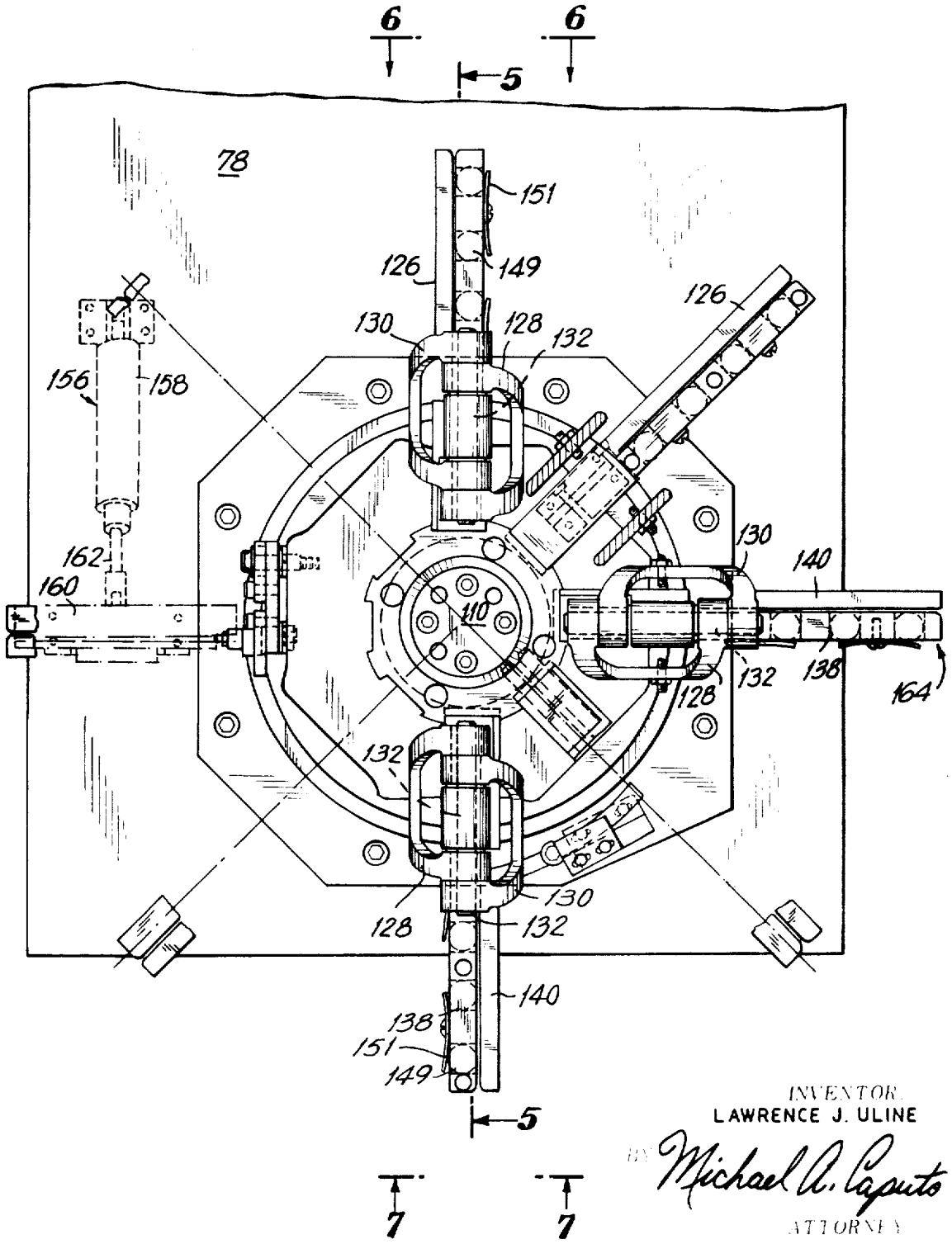

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FIG. 5

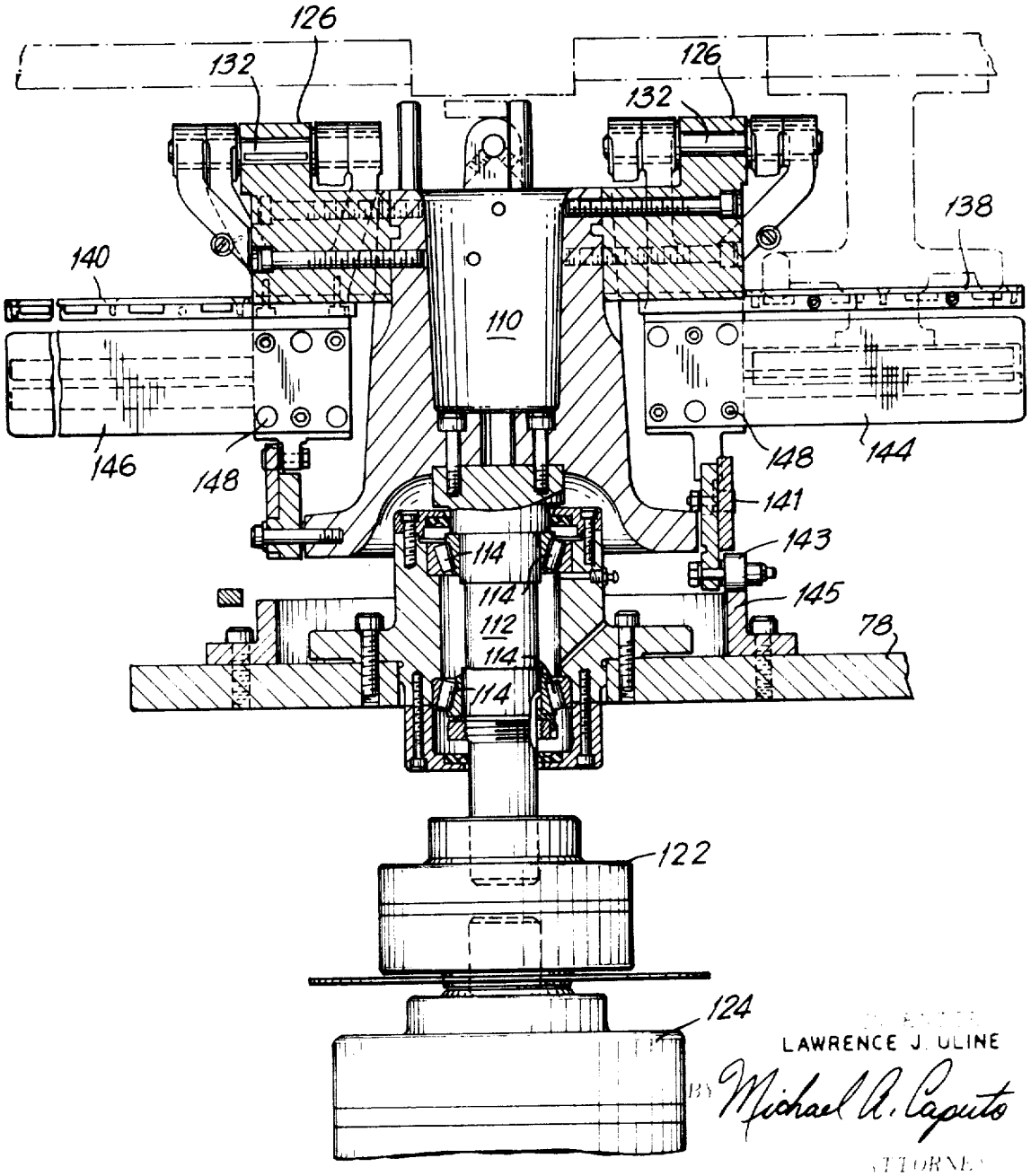

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FIG. 7

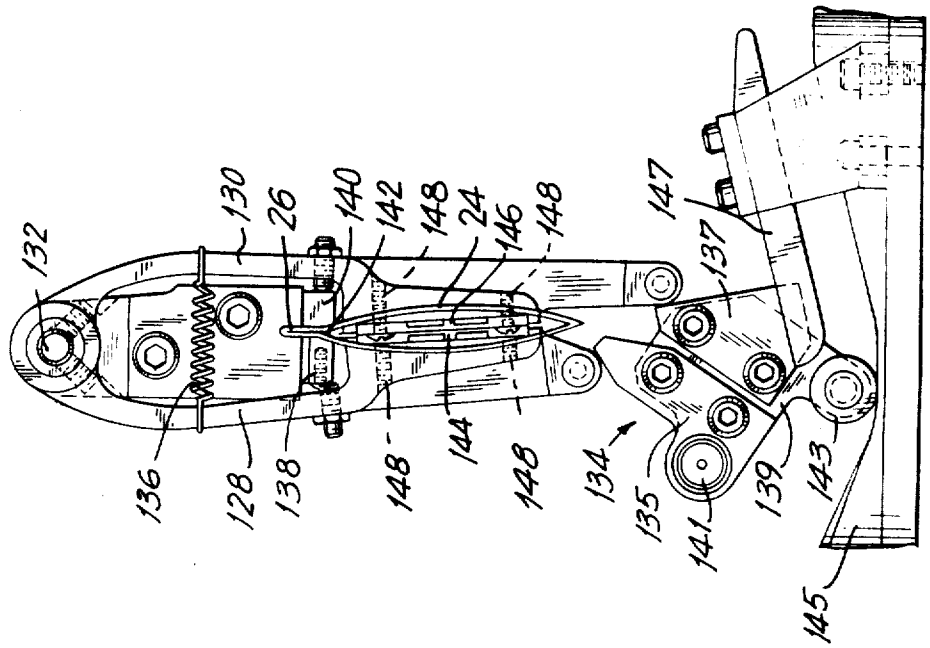

FIG. 6

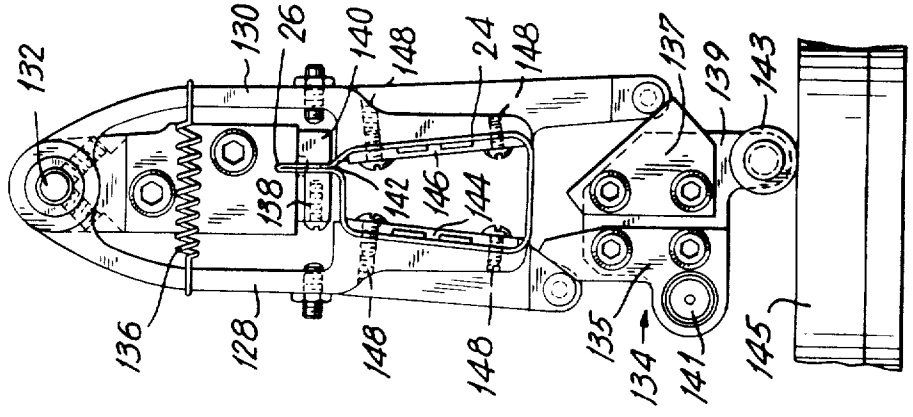

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FIG. 8

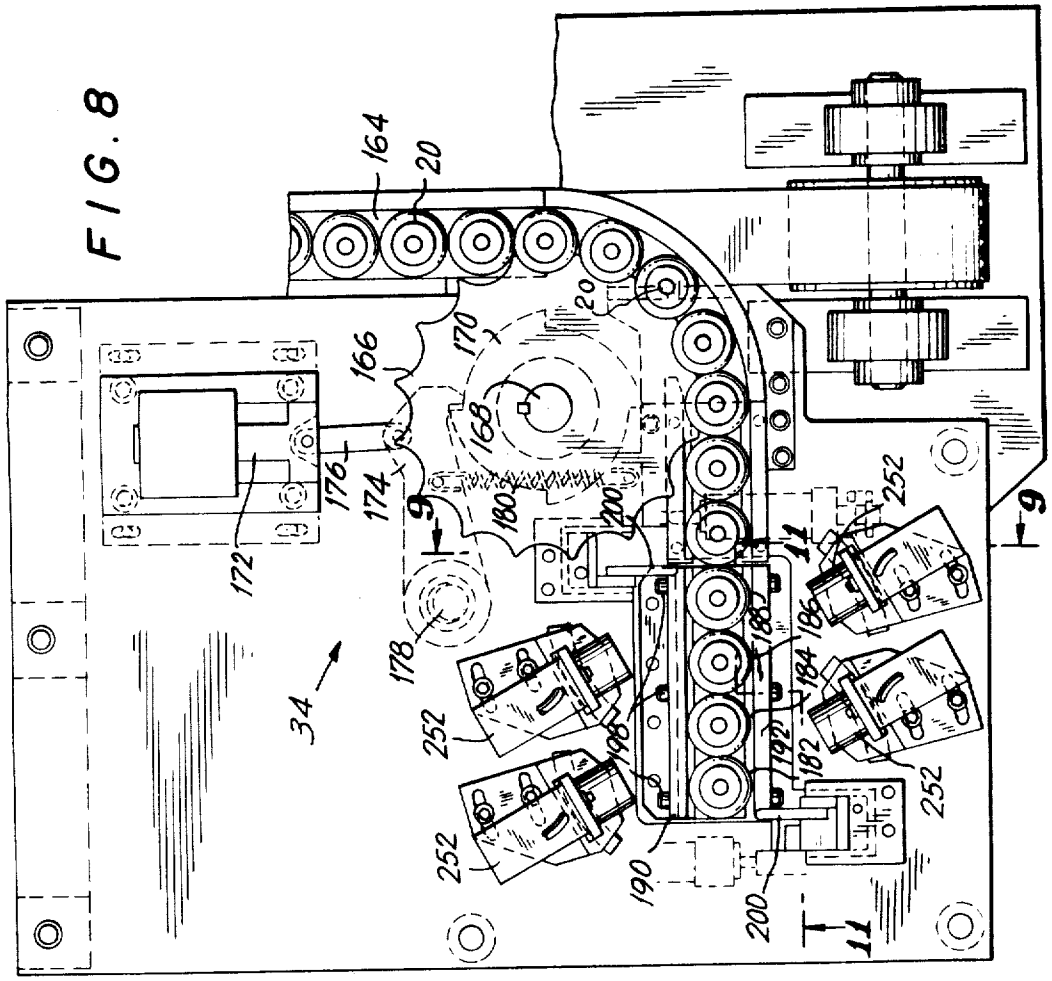

FIG. 10

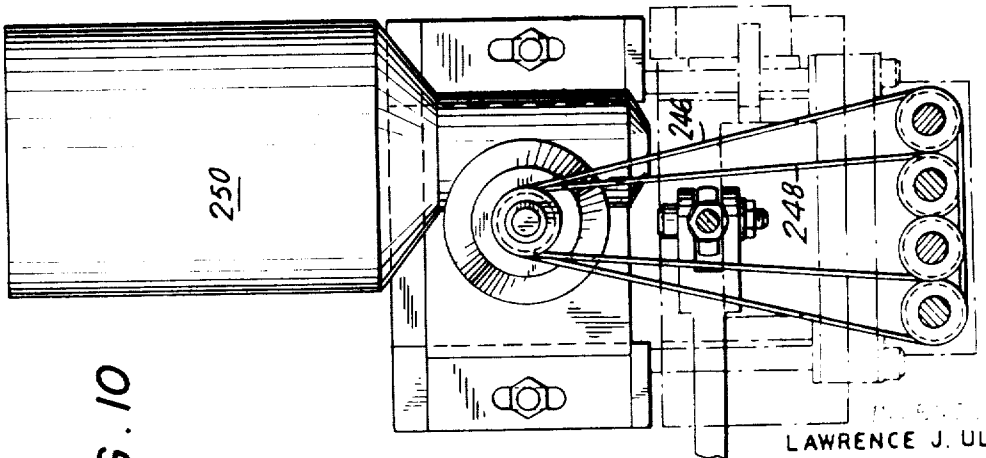

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FIG. 9

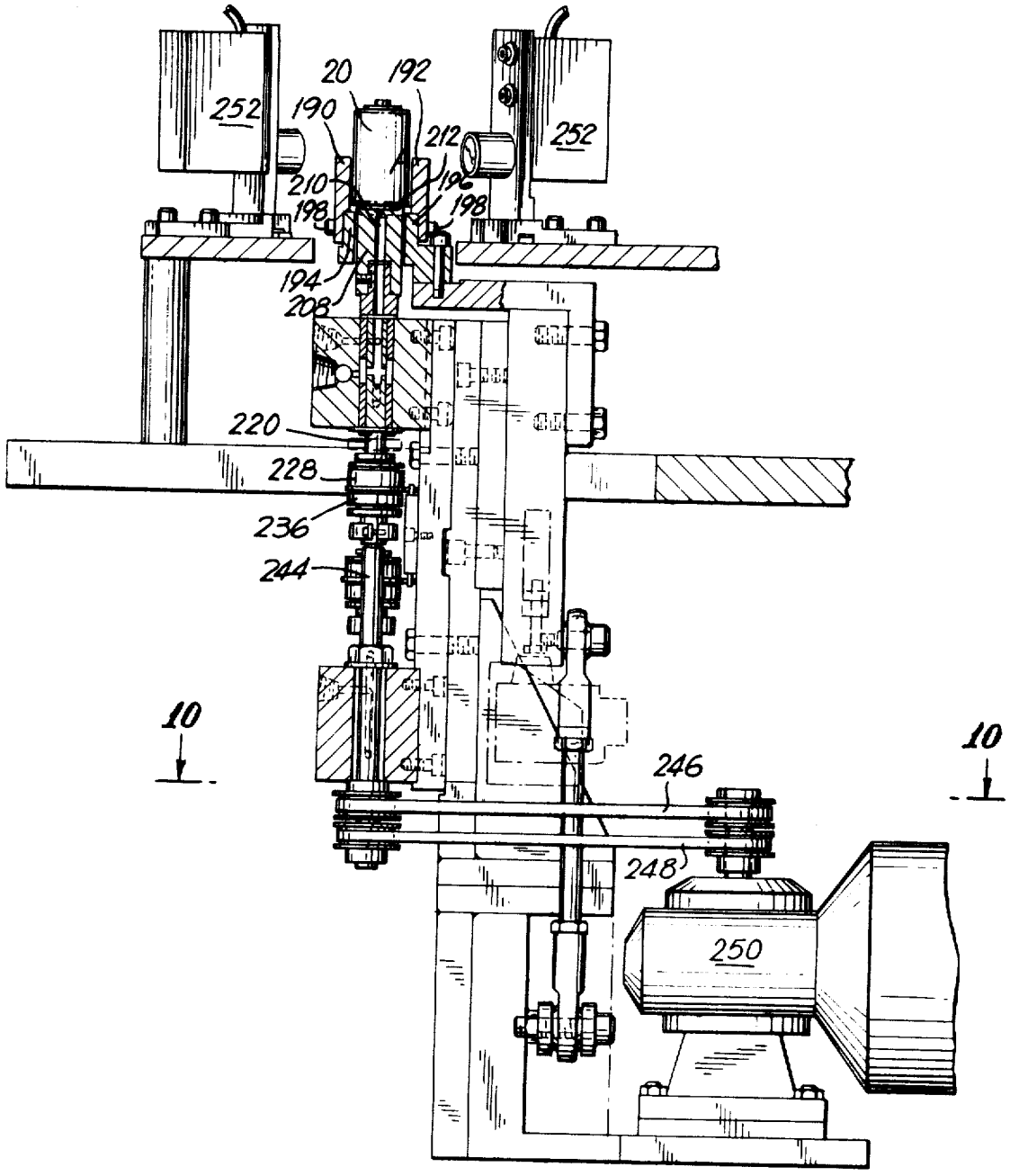

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FIG. 11

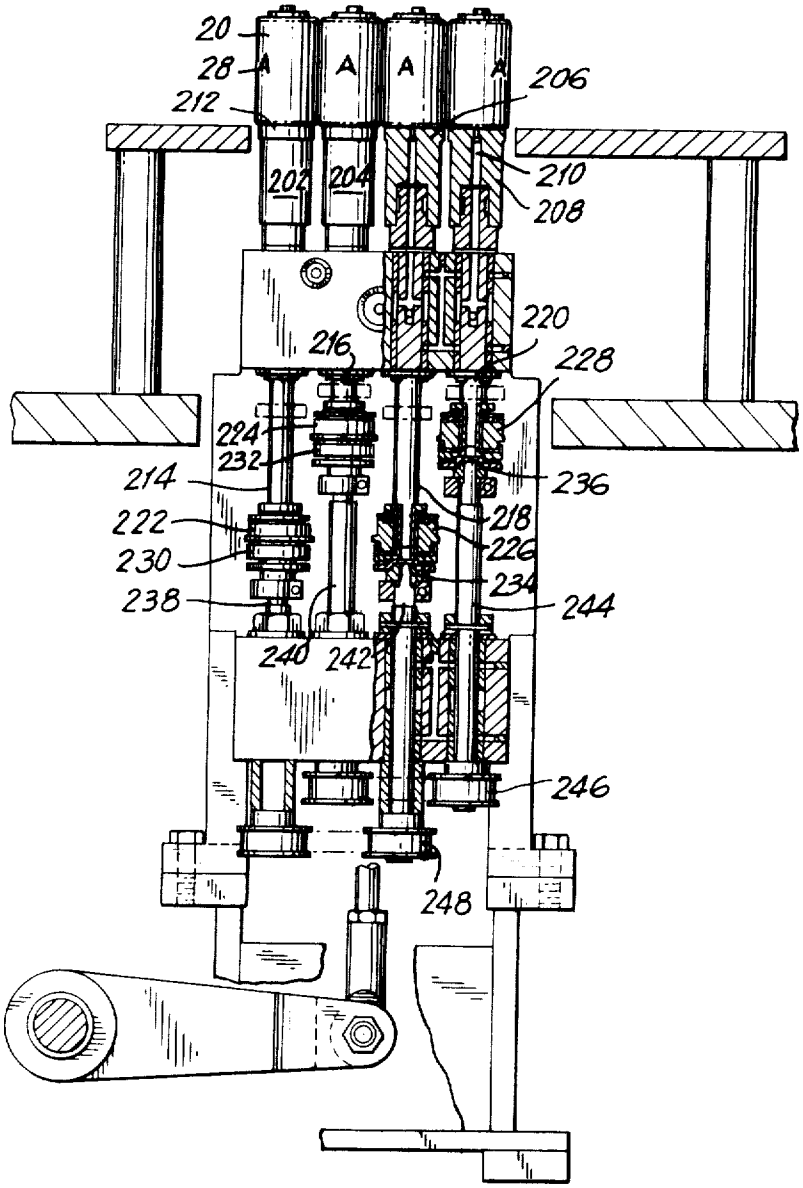

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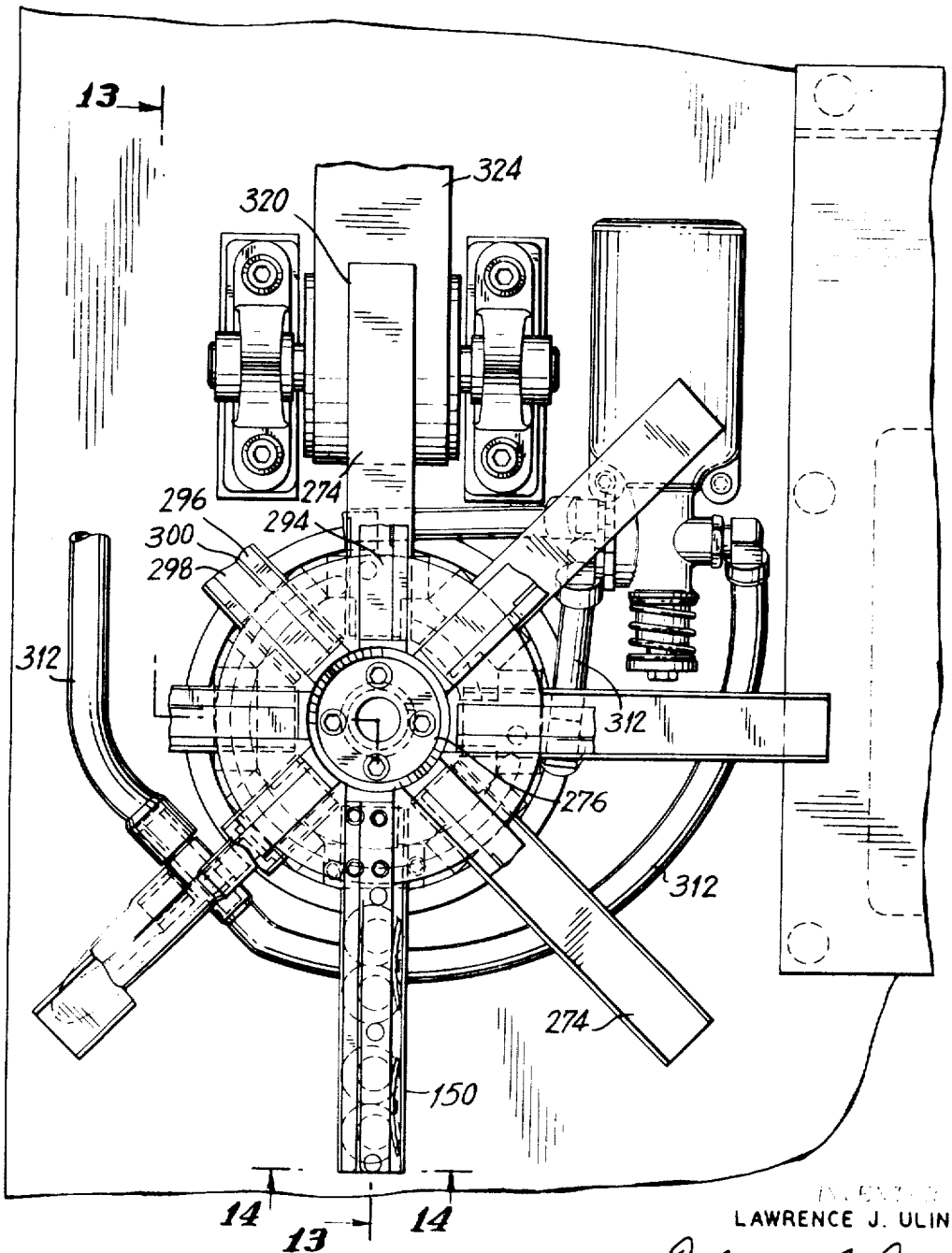
FIG. 12



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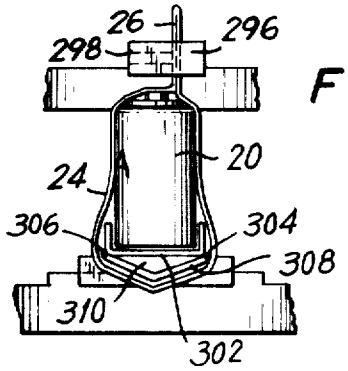
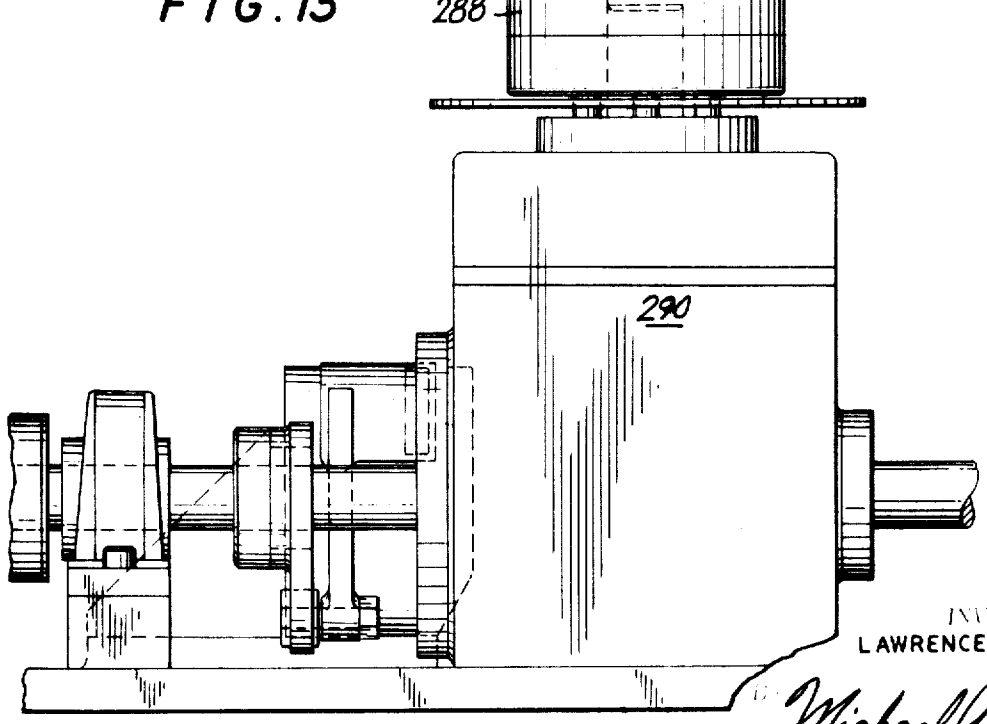


FIG. 14

FIG. 13



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MACHINE FOR FILLING PREFORMED POUCHES

This invention relates to a machine for filling preformed pouches with a plurality of articles and has particular reference to a machine for filling a preformed heat shrinkable pouch with a plurality of articles while maintaining the relative position of the articles to each other and to the pouch during filling and handling of the filled pouch.

The general object of the invention is to provide a new and improved machine of the above character in which the pouches and articles to be packaged are moved through a series of stations wherein the pouches are opened to receive the articles and are transferred onto the articles without disturbing their relative position and the pouch-article combination is ultimately removed from the machine again without disturbing the relative position of the articles to each other or to the pouch.

Articles which may be packaged with the machine of the present invention are generally but not necessarily those which are capable of standing upright on end without support. Preferably the articles are of cylindrical configuration such as soda or beer cans, flashlight batteries, cylindrical bottles and the like, but other regular and irregular shaped articles may also be packaged with a minimum of adjustment to the machine.

The term "pouch" as used herein and in the appended claims is intended to refer to a package which is generally tubular in shape and has two open ends and a header board extending from its top. Preferably the pouch is formed from a heat shrinkable thermoplastic film but other materials, such as an open ended paper tube may also be used.

U.S. Pat. No. 3,424,306 describes a package comprising a strip of heat shrinkable thermoplastic film folded upon itself in approximate edge-to-edge relationship having a header board of relatively rigid sheet material such as a paper board, proximate to the edges of the film and forming an appendage extending from the package. The operation of the machine of the present invention will be described in detail with specific reference to a package in accordance with this patent but it will be obvious to those skilled in the art that other packages comprising a closed periphery of packaging material having open sides and an appendage extending from the package along its periphery and parallel to the opening through the package will also be useful.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which:

FIG. 1 is an isometric plan view, partially cut away, showing the general layout of a machine embodying the novel features of the present invention;

FIG. 2 is an enlarged sectional view taken along line 2—2 in FIG. 1 at the package-product work level of the machine and shows the pouch transfer carriage at the pouch feed position;

FIG. 3 is a sectional view taken along line 3—3 of FIG. 2;

FIG. 4 is a top plan view, partially in section, showing the indexing mandrel unit of the machine of the present invention.

FIG. 5 is a cross-sectional view taken along line 5—5 of FIG. 4;

FIG. 6 is an enlarged view of an individual mandrel in its expanded position and taken along line 6—6 of FIG. 4;

FIG. 7 is a view similar to FIG. 6 but shows the mandrel in its contracted position and is taken along line 7—7 of FIG. 4;

FIG. 8 is a top plan view of an article orientor useful in conjunction with the machine of the present invention;

FIG. 9 is a cross-sectional view taken along line 9—9 of FIG. 8;

FIG. 10 is a plan view in section taken along line 10—10 of FIG. 9;

FIG. 11 is a cross-sectional view taken along line 11—11 of FIG. 8;

FIG. 12 is a top plan view, partially in section, of the indexing horn unit of the machine of the present invention;

FIG. 13 is a cross-sectional view taken along line 13—13 of FIG. 12; and

FIG. 14 is a cross-sectional view taken along line 14—14 of FIG. 12 displaying product and pouch prior to removal from the machine.

As shown in the drawings for purposes of illustration, the invention is embodied in a machine for inserting articles in preformed pouches for the purpose of attractive salability and product protection. The machine is particularly adapted for packaging free standing cylindrical articles such as flashlight batteries **20** in preformed pouches **22** (FIG. **14**) comprising a loop of thermoplastic material **24** having its edges heat sealed to a header board **26** forming an appendage extending from the top of the pouch. Header board **26** is provided with a notch at each end to enable a stack of pouches to be supported from a pair of parallel guide rails onto which the notches may rest as the pouches are processed through the pouch supply magazine.

For purposes of illustration, the drawings show a machine for packaging four flashlight batteries **20**, arranged in upright position in a single row, in a pouch **22** having loop **24** formed from a heat shrinkable transparent thermoplastic film. The batteries each bear some indicia **28** on their labels and are packaged with the indicia facing in a predetermined direction to provide easy viewing of the indicia through the transparent thermoplastic film.

The machine of the present invention basically comprises an indexing horn assembly **30**, an indexing mandrel assembly **32** and various transfer shuttle carriages for delivering pouches to the mandrel assembly, delivering articles to be packaged to the horn assembly, transferring pouches from the mandrel assembly to the articles on the horn assembly and transferring pouches with articles contained therein from the horn assembly at an appropriate discharge station. Also, for purpose of illustrating a preferred machine construction in accordance with the present invention, an orientor assembly, generally designated **34**, is included for orienting batteries **20** such that indicia **28** faces in a predetermined direction before batteries **20** are loaded onto the indexing horn assembly **30** and prior to placing pouch **22** over the batteries.

Referring in detail to the drawings, the preferred machine construction which is set forth for purposes of illustration comprises a pouch supply magazine **36** having parallel guide rails **38** along its top edges. The guide rails are spaced apart approximately the width of pouch **22** and are positioned in a manner such that the notches in the header board **26** of pouches **22** will rest on the guide rails **38** supporting the pouches by their header boards **26** with loop of thermoplastic film **24** hanging in the trough of supply magazine **36**. Pouches **22** are preformed and supplied to supply magazine **36** in flat condition aligned in a stack **40**. Pouch supply magazine **36** has rails, **42**, **44** disposed along its top on opposite sides of the trough formed by the magazine. Constant pressure pads **46**, **48** are slidably mounted on rails **42**, **44** and are rotatable about the rails from a position within the trough of pouch supply magazine **36** to a position clear of the trough.

A slicer assembly **50** is disposed at the inside end of pouch supply magazine **36** and engages the inner most pouch of stack **40**. The slicer assembly **50** includes a vertically operating slicer blade **52** which is clear of stack **40** in its upward stroke and pushes down on the first pouch of stack **40** in its downward stroke to separate this first pouch from the remainder of the stack. Slicer assembly **50** is also provided with a movable bar (not shown) containing a vacuum pad which bar moves vertically with the slicer blade **52** and can either assist the slicer blade by pulling downward on the loop of thermoplastic film of the pouch or can operate independently of the slicer blade. A small pin (not shown) is positioned to protrude through a hole or slot in the header board **26** and is mounted on a separate vacuum pad which grips the header board to elevate the pouch to the work level of the machine where it is transferred to an intermediate stationary vacuum header board holder.

A shuttle carriage **54** is slidably mounted on guided bearings **55** which run upon rails **56**, **60** and extend the length of the

working area of the machine. Rails **56, 60** are hung from supports **62, 64, 66, 68** extending from the bottom of frame member **70**. Frame member **70** is supported at one end by stanchion **72** and at the other end by housing **74** and is the main support for rails **56, 60** and the transfer mechanisms which move thereon. The remaining machine parts are supported by a base **76** and work table **78** which rests thereon.

Shuttle carriage **54** comprises a pair of reciprocating lever arms **80, 82** which pivot about rail **58** in reaction to forces applied to arms **84, 86** through levers **88, 90**. A plunger **92** extends between lever arms **80, 82** part of the way down the arms and forms a pair of mechanical gripper bars **94, 96** which securely grip the header board of a pouch when in a closed position. Lever arms **80, 82** each terminate in an inwardly extending vacuum shoe **98, 100** which support at their inner ends vacuum bars **102, 104** connected through hoses **106, 108**, respectively, to a suitable source of vacuum, such as vacuum pump **111**.

Indexing mandrel assembly **32** is an eight-station carousel comprising a hub **110** extending from a shaft **112** which is rotatably mounted through bearings **114**, safety clutch **122**, and indexer **124**. Extending from hub **110** are eight identical arms **126** each equipped with a pair of supports **128, 130** pivotally mounted on pin **132**. The lower portion of supports **128, 130** is in contact with a cam complex **134** which engages both supports and moves them from an expanded position (FIG. 6) to a contracted position (FIG. 7) against the force of spring **136**. Between pivot pin **132** and cam complex **134** is the pouch receiving portion of the arm which comprises a pair of parallel bars **138, 140** having a header board holding slot **142** therebetween, and a pair of flat movable mandrel plates **144, 146**. Mandrel plates **144, 146** are secured to supports **128, 130**, respectively, by screws **148** and expand or contract as supports **128, 130** are expanded or contracted by pivoting about pin **132** through the force exerted by cam complex **134**. Cam complex **134** is made up of cams **135** and **137** which are joined through plate **139** and pivot about pin **141**. These cams ride, through roller **143**, on stationary cam **145** or between stationary cam **145** and guide shoe **147**.

Shuttle carriage **54** is movable from a position above the intermediate header board holder to a position straddling bars **138, 140** and plates **144, 146** of indexing mandrel assembly **32**. During its movement from the intermediate header board holder to the mandrel assembly a vacuum is drawn on vacuum bars **102, 104** and the vacuum bars are cammed outward. In this way, the loop of thermoplastic film **24**, which forms the body of pouch **22** positioned between the vacuum bars will be opened slightly. In their pouch receiving position, supports **128, 130** of the mandrel assembly are in their contracted position, as shown in FIG. 7. As shuttle carriage **54** straddles mandrel plates **144, 146**, the pouch is slid over the contracted mandrel plates and the header board **26** is slid into header board holding slot **142**. The header board is then held in header board-holding slot **142** and the pouch is released by shuttle carriage **54** which returns to its position over the intermediate header board holder. Parallel bars **138, 140** which define header board-holding slot **142** have a plurality of rotatable discs **149** recessed therein and biased by flat leaf springs **151** to protrude into header board-holding slot **142**. Upon insertion of a header board into a header board-holding slot **142** the discs **149** are rotated by the advancing header board and act to retain the header board within the slot until withdrawn therefrom by a pair of mechanical grippers.

The mandrel assembly **32** is then indexed clockwise and, while being indexed, activates cam complex **134** to spread supports **128, 130** to their expanded position.

Since pouch **22** is stored in flat stack **40**, a crease is present at the bottom of the loop of thermoplastic film **24**. To facilitate the production of a uniform package after heat shrinking it is desirable to remove the crease before the heat shrinking is initiated. For this purpose, a crease removal unit **156** is provided two stations after the pouch receiving station of the indexing mandrel assembly. This unit comprises a housing **158** secured to work table **78** and having a thermostatically controlled heater bar **160** secured in working engagement with said housing through arm **162**. Housing **158** is movable and in its operative position the heater bar **160** will be in the same plane as the crease of a pouch present on an arm of said mandrel assembly for a fraction of a second and will heat the crease to the lower limit of the softening point of the thermoplastic material thereby relaxing the crease and establishing a symmetrical loop of thermoplastic film. To prevent damage to pouches on the mandrel assembly when the machine stops, the heater assembly housing **158** is movable sideways to remove the heater bar from the vicinity of any thermoplastic material and the creases.

Flashlight batteries **20** are supplied to the machine in a single row, standing on end, on a belt conveyor **164** from a suitable source of supply (not shown) such as a battery assembly machine. As the batteries move along conveyor **164** they contact a metering device consisting of a star wheel **166** which is connected through axle **168** to ratchet **170**. Solenoid **172** is connected to pawl **174** through arm **176** and pivots the pawl about pin **178**, against the force of spring **180**, to momentarily disengage ratchet **170**. When solenoid **172** pulls out pawl **174**, ratchet **170** and star wheel **166** are permitted to revolve in a clockwise direction under the influence of the force of the batteries being moved along by conveyor **164**. After permitting the required number of batteries to pass, ratchet **170** with star wheel **166** attached is automatically stopped by pawl **174**. Rotation moves the required number of batteries forward by pushing until the first battery abuts locating guide **200**. At this position batteries have been moved into orienting stations **182, 184, 186, 188**.

In the orientor stations, the batteries are resting on a guide track comprising guide rails **190, 192** and parallel tracks **194, 196** which are secured to the guide rails by screws **198**. A second locating guide **201** is activated in the trough formed by guide rails **190, 192** and reciprocates from a position withdrawn from the path of the batteries to a position contacting the outside edge of the last battery on the parallel tracks **194, 196** thereby positioning the batteries over the orienting stations on the parallel tracks without creating excessive spacing between the individual batteries. Below the orientor stations are located chucks **202, 204, 206, 208** each having a hollow core through its center communicating with a dish-shaped seat **212** of a configuration which will form a seal with the bottom of flashlight battery **20**.

When flashlight batteries **20** are in position they come into contact with the rotating chucks. The batteries are held to their respective chucks by vacuum and immediately start rotating until the orientation cycle is completed. Chucks **202, 204, 206, 208** are connected at their lower ends to upper spindles **214, 216, 218, 220** which each include a clutch **222, 224, 226, 228**, respectively, and a brake, **230, 232, 234, 236** respectively. Lower spindles **238, 240, 242, 244**, respectively, are rotated continuously in a counter clockwise direction at a constant speed through gear belts **246, 248** by motor **250**.

Above and to the side of each chuck is positioned a photoelectric scanner **252** which projects a concentrated light beam to the label of a battery attached to and rotating with the chuck. Each photoelectric scanner **252** is linked through an appropriate photoelectric relay to the brake and clutch of the upper spindles **214, 216, 218, 220**. As the light beam contacts contrasting arrangements of colors on the battery labels, impulses are sent to a photoelectric relay. This relay is programmed to react when a signal is received indicating that indicia **28** has been scanned by the beam of light. The relay then immediately disengages the clutch and applies the brake to stop the rotation of the upper spindle, chuck and battery. Stopping of each rotating unit is independent of the others and can be controlled such that the indicia are facing in any desired direction. When orientation is completed, the vacuum drawn on the bottom of the batteries is broken and guide rails **190, 192** and parallel tracks **194, 196** are raised to remove the batteries from the chucks and raise them to their initial position.

Positioned above the orientor assembly **34** is a battery transfer shuttle generally designated **254**, slideably mounted on railings **256, 258** and comprising a pair of reciprocating rubber faced gripper jaws **260**. This device is operated by means of a cam **262**, through lever **264** and slide **266** causing cam roller **268** to move up and down with linear track **270** thereby activating the gripper jaws **260** to close upon the previously oriented cells at orienting stations **182, 184, 186, 188**. Another cam (not shown) is operatively connected to battery transfer shuttle **254** through linkage **272** and causes movement of the transfer shuttle along rails **256, 258** until the shuttle is in position above a horn **274** of indexing horn assembly **30** at which point the cells are now positioned in the horn channel by being slid into position through the open front of the horn channel. The rubber faced gripper jaws are then opened to release the batteries and the mechanism is returned to its initial position over the orientor for the start of the next cycle.

The indexing horn assembly **30**, like the indexing mandrel assembly **32**, is an eight-station carousel and comprises a hub **276** extending from a shaft **278** which is rotatably mounted through bearings **280, 282, 284, 286**, safety clutch **288**, and indexer **290**. Extending from hub **276** are eight identical arms **292** each including a header board holder **294** and a horn **274**.

The header board holder is a pair of parallel bars **296, 298** having a header board-receiving slot **300** therebetween. Each horn **274** is a long U-shaped trough **302** slightly wider than a flashlight battery welded at ends **304, 306** near center to a metal V-shaped mounting plate **308**. The mounting plate forms a V-shaped channel **310** below U-shaped trough **302** which acts as a vacuum chamber and is generally separated from the U-shaped trough by the bottom of the trough. Channel **310** is connected to a source of vacuum through mechanically controlled metal passages **312**. When applied, this vacuum acts, through the holes in the bottom of trough **302** to hold the batteries in their positions and alignment on the trough **302**.

Horn assembly **30** indexes in a clockwise direction and two index stations after receiving batteries from battery transfer shuttle **254** is aligned with arm **126** of the indexing mandrel assembly **32** at its pouch transfer station **150**. A pouch transfer carriage **314** straddles the aligned arms of horn assembly **30** and mandrel assembly **32** in their pouch transfer stations **150** and **56, 60** from a position above the arm of the mandrel assembly to a position above the arm of the horn assembly. Carriage **314** includes a pair of reciprocating gripper bars **316** for grasping a header board held by parallel bars **138, 140** of said mandrel assembly and a pair of reciprocating vacuum bars **318** for grasping a loop of thermoplastic material **24** surrounding mandrel plates **144, 146** and retaining the loop of material in its open position. In operation, the pouch transfer carriage **314** moves into position over parallel bars **138, 140** and mandrel plates **144, 146** of arm **126** of said mandrel assembly and closes gripper bars **316** on the header board of a pouch on the arm of the mandrel assembly while vacuum bars **318** close on the loop of the thermoplastic material of said pouch which has now been fully opened by mandrel plates **144, 146**. A vacuum is then drawn on vacuum bars **318** to retain the loop of thermoplastic material in its opened position and the pouch transfer carriage is slid along rails **56, 60** to a position straddling the horn of said horn assembly which is at the pouch transfer station. The header board of the pouch is thereby slid into header board holder **294** while the loop of thermoplastic material straddles horn **274** and the batteries resting thereon. At this point the pouch transfer carriage **314** releases the pouch and it is supported entirely by header board holder **294**. The carriage is then moved off the horn and back to the mandrel assembly after the mandrel assembly indexes one station.

The indexing horn assembly **30** is then indexed clockwise through four index stations until it arrives at package removal station **320**. At this point there is located a package transfer shuttle **322** which is slideable on rails **56, 60** from a position above the horn assembly which is at its package removal station to a position above a belt conveyor **325** which runs through housing **74** to a heat shrink tunnel (not shown) where the loop of thermoplastic material is heat shrunk around the flashlight batteries to form the finished package.

Package transfer shuttle **322** comprises two pairs of reciprocating gripper bars **326, 328**, one pair **326** for gripping the header board of a package and other pair **328** for gripping the loop of thermoplastic material and flashlight batteries contained therein. In operation, the gripper bars are closed about a pouch-battery combination at package removal station **320** in a manner such that the relative alignment of the batteries to each other, to the header board and to the loop of thermoplastic material is not disturbed. The shuttle is then slid along rails **56, 60** until clear of horn **274** and the package is released onto belt conveyor **324** by first allowing the batteries to drop to the bottom of the pouch followed in quick succession by releasing the header board to drop the entire unit onto the conveyor.

With the foregoing arrangement the machine cycle begins by the first pouch **22** of stack **40** being raised by slicer assembly **50** and subsequent mechanisms to a position where it is grasped by shuttle carriage **54** and loop of thermoplastic material **24** is slightly opened by vacuum bars **102, 104** while mechanical gripper bars **94, 96** securely hold header board **26**. The shuttle carriage **54** is then moved to a position over closed mandrel plates **144, 146** in a manner such that header board **26** is grasped by parallel bars **138, 140** and loop of thermoplastic material **24** is around the closed mandrel plates. The shuttle carriage is then moved back to receive another pouch and the mandrel assembly is indexed 45°. During this movement supports **128, 130** are spread to their open position by cam complex **134**.

At this point flashlight batteries **20** have been fed along belt conveyor **164** to a point where they engage star wheel metering device **166** which is allowed to rotate a sufficient distance under the influence of the force of the batteries being moved along by conveyor **164** to move four flashlight batteries into orientor stations **182, 184, 186, 188** and orientation is accomplished as previously described. The mandrel assembly is then indexed another 45° to a position above crease removal unit **156** where the crease in the loop of thermoplastic material **24** is contacted by heater bar **160** and the plastic is relaxed to eliminate the crease. While this is being accomplished battery transfer shuttle **254** moves into position above orientor stations **182, 184, 186, 188**, gripper jaws **260** are closed on the four batteries at the orienting stations and the shuttle is moved along rails **256, 258** until the batteries are positioned on horn **274** where they are released by the gripper jaws and the transfer shuttle returns to its original position. While on the horn the batteries are held in place by a vacuum being drawn through the holes in the bottom of U-shaped trough **302**.

From the crease removal station and the battery receiving station the mandrel assembly and horn assembly, respectively, are each indexed through two 45° clockwise movements until both are aligned at pouch transfer station **150**.

Pouch transfer carriage **314** is then slid along rails **56, 60** into position above mandrel arm **126** and gripper bars **316** are closed about the header board of the pouch at this station while a vacuum is drawn on vacuum bars **318** to hold the loop of thermoplastic material which is in its fully expanded condition. The transfer carriage is then slid along the rails until the header board has been inserted into header board holder **294** of the horn assembly and the loop of thermoplastic material has been positioned about horn **274** and the batteries thereon. The gripper bars then release the pouch and the transfer carriage moves clear of the horn assembly.

The horn assembly is indexed through four 45° advances until it arrives at package removal station **320**. At this point transfer shuttle **322** comes into position above the horn and, through two pairs of mechanical grippers grasps the header board and the body of the package including both the loop of thermoplastic material and the four batteries therein. The shuttle then glides along rails **56, 60** to a position removed from the horn assembly and above a belt conveyor **324** onto

which the package is deposited to be carried to a heat shrink tunnel where the loop of thermoplastic material is shrunk tightly around the flashlight batteries to form the finished package. Preferably, two heat shrunk tunnels are used, the first being set at a lower temperature than the second. In this way the plastic is first preheated without shrinking and subsequently is quickly heat shrunk. This procedure has been found to yield a more uniformly shrunk wrapper and consequently a more visually appealing package.

Through each of the transfers and manipulations of the pouch and the batteries they are held against unwanted movement and the relative position and orientation of the batteries is preserved as well as their position within the pouch and the relationship of the header board of the pouch to the row of batteries.

If desired, a multiplicity of packages may be formed during each cycle of the machine. For example, the above describes in detail how a package containing four batteries is produced, but the teachings set forth will be equally applicable to the formation of two packages each containing two batteries. To accomplish this end it is necessary merely to insert a spacer midway between rails **38** of pouch supply magazine **36** and position two rows of pouches, each approximately one half the width of the pouches shown in the drawings, in the magazine in place of the single stack **40**. The handling of the pouches is the same as described above except that, instead of grasping a single header board, the various gripper bars will hold two aligned header boards. Likewise, instead of holding open a single loop of thermoplastic material by means of vacuum, two aligned loops are held open.

With regard to the batteries, it is merely necessary to modify battery transfer shuttle **254** in a manner such that upon transfer of batteries from their orientor stations to horn **274** they are separated into two groups of two batteries each rather than a single group of four batteries. This alignment can be maintained by all the transfer mechanisms until finally, at package removal station **320**, two packages of two batteries each are deposited on the conveyor rather than a single package of four batteries.

It is therefore seen that there is provided an improved machine for filling preformed pouches which machine will be particularly useful in packaging free standing articles into pouches having an appendage extending therefrom.

However, while the foregoing description sets forth a preferred embodiment of the invention, it is apparent that numerous changes may be made in the mechanism described without departing from the spirit of the invention. It is therefore desired that the present embodiment be considered in all respects as illustrative rather than restrictive, reference being had to the appended claims rather than the foregoing description to indicate the scope of the invention.

What is claimed is:

1. A machine for packaging product in a tubular pouch which comprises:
   a. a product supply means;
   b. a pouch supply means;
   c. a package removal means;
   d. a multi-station indexing horn assembly having at least one product receiving horn mounted thereon and extending therefrom;
   e. means for indexing said horn assembly to bring said horn successively adjacent to said product supply means to receive a product, a pouch transfer station and said package removal means;
   f. a multi-station indexing mandrel assembly having at least one mandrel mounted thereon and extending therefrom,
   g. means for indexing said mandrel successively adjacent to said pouch supply means to receive a pouch and to said pouch transfer station;
   h. said horn assembly and said mandrel assembly being mounted in a manner such that said horn and said mandrel are transversely aligned when at said pouch transfer station; and
   i. transfer means at said pouch transfer station for transferring a pouch from said mandrel to said horn containing the product to be packaged.

2. A machine for packaging one or more articles in a pouch formed from a strip of thin heat shrinkable thermoplastic film folded upon itself in approximate edge-to-edge relationship and having a header board of relatively rigid sheet material heat sealed to said edges forming a tube of thermoplastic material with the header board extending therefrom, said machine comprising:
   a. an article supply means;
   b. a pouch supply means;
   c. a package removal means;
   d. a multi-station indexing horn assembly having at least one article receiving horn mounted thereon and extending therefrom;
   e. means for indexing said horn assembly to bring said horn successively adjacent to said article supply means to receive the articles to be packaged, a pouch transfer station and said package removal means;
   f. a multi-station indexing mandrel assembly having at least one mandrel mounted thereon and extending therefrom;
   g. means for indexing said mandrel assembly successively adjacent to said pouch supply means to receive a pouch and to said pouch transfer station;
   h. said horn assembly and said mandrel assembly being arranged in a manner such that said horn and said mandrel are transversely aligned when at said pouch transfer station; and
   i. transfer means at said pouch transfer station for transferring a pouch from said mandrel to said horn containing the articles to be packaged.

3. A machine in accordance with claim **2** wherein said article supply means includes means for randomly aligning in single file a plurality of articles to be packaged and a shuttle for gripping said articles and transferring same to a horn of said horn assembly.

4. A machine in accordance with claim **3** wherein said article supply means further includes means for orienting said articles to face in a predetermined direction before transfer to said horn.

5. A machine in accordance with claim **4** wherein said article orienting means includes a plurality of vacuum chucks each individually rotatable and controlled by a clutch-brake assembly, a photosensitive scanner associated with each chuck and means controlling operation of said clutch-brake assembly to permit rotation of said chuck when an article is seated thereon and to brake said chuck when said article has been rotated to a predetermined position as indicated by a signal from said photosensitive scanner.

6. A machine in accordance with claim **2** wherein said article supply means includes:
   a. means for randomly aligning in single file a plurality of indicia bearing articles to be packaged;
   b. means in combination with indicia detecting means for orienting such articles to face said indicia in a predetermined desired direction;
   c. means for actuating said orienting means in response to a signal from said indicia detecting means; and
   d. a shuttle for gripping oriented articles and transferring same in their predetermined orientation to said horn.

7. A machine in accordance with claim **2** wherein said pouch supply means includes a shuttle for transferring said pouch onto a mandrel of said mandrel assembly and means for supplying said pouch to said shuttle in a flat condition.

8. A machine in accordance with claim **7** wherein said pouch supply means includes means associated with said shuttle for partially opening said flat pouch before transferring same to said mandrel.

9. A machine in accordance with claim **2** wherein said pouch supply means includes:
   a. a pouch supply magazine for storing a plurality of pouches;
   b. a pouch holder;

c. a pouch separator for separating a single pouch from said magazine and delivering same to said pouch holder; and

d. a shuttle for transferring said held pouch onto a mandrel of said mandrel assembly.

10. A machine in accordance with claim 9 wherein said pouch supply means further includes means associated with said shuttle for partially opening said pouch before transferring same to said mandrel.

11. A machine in accordance with claim 2 wherein said package removal means includes at least one pair of mechanical grippers transversely aligned with an article and pouch containing horn and movable from a position above said horn to a position above a conveyor in a manner such that closing the grippers in their position above said horn gives a positive clamping of said article containing pouch, and opening said grippers in their position above the conveyor releases said article containing pouch onto the conveyor in the same relative alignment present on said horn.

12. A machine for packaging a plurality of flashlight batteries in a pouch formed from a strip of thin heat shrinkable thermoplastic film folded upon itself in approximate edge-to-edge relationship and having a header board of relatively rigid sheet material heat sealed to said edges forming a tube of thermoplastic material with the header board extending therefrom, said machine comprising:

a. a battery supply means;

b. a pouch supply means;

c. a package removal means;

d. a multi-station indexing horn assembly having at least one battery receiving horn mounted thereon and extending therefrom;

e. means for indexing said horn assembly to bring said horn successively adjacent to said battery supply means to receive a plurality of batteries, a pouch transfer station and said package removal means;

f. a multi-station indexing mandrel assembly having at least one mandrel mounted thereon and extending therefrom;

g. means for indexing said mandrel assembly successively adjacent to said pouch supply means to receive a pouch and to said pouch transfer station;

h. said horn assembly and said mandrel assembly being arranged in a manner such that said horn and said mandrel are transversely aligned when at said pouch transfer station; and

i. transfer means at said pouch transfer station for transferring a pouch from said mandrel to said horn containing the batteries to be packaged.

13. A product orientor, for use in a packaging machine which comprises means for supplying an indicia bearing product to an orientor station, means in combination with indicia detecting means for orienting said article to face said indicia in a predetermined direction, means for actuating said orienting means in response to a signal from said indicia detecting means, and means for removing said oriented article from said orientor station; said orienting means including a rotatable chuck, a clutch-brake assembly controlling rotation of said chuck, a photosensitive scanner associated with said chuck and means controlling operation of said clutch-brake assembly to permit rotation of said chuck when a product is seated thereon and to brake said chuck when said product has been rotated to a predetermined position as indicated by a signal from said photosensitive scanner.

14. A product orientor in accordance with claim 13 wherein said rotatable chuck is a vacuum chuck.

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