

[54] APPARATUS FOR TUCKING AND FOLDING

[75] Inventor: Andrew W. Anderson, West  
Caldwell, N.J.

[73] Assignee: Scandia Packaging Machinery  
Company, North Arlington, N.J.

[22] Filed: July 29, 1971

[21] Appl. No.: 167,510

Related U.S. Application Data

[63] Continuation of Ser. No. 858,370, Sept. 16, 1969,  
abandoned.

[52] U.S. Cl. .... 53/378, 53/230

[51] Int. Cl. .... B65b 11/42, B65b 49/04

[58] Field of Search ..... 53/230-233,  
53/378, 379

[56] References Cited

UNITED STATES PATENTS

|           |         |                      |          |
|-----------|---------|----------------------|----------|
| 1,472,096 | 10/1923 | Streich.....         | 53/379   |
| 1,873,060 | 8/1932  | Smith.....           | 53/230   |
| 3,005,298 | 10/1961 | Johansen et al. .... | 53/378 X |
| 3,372,526 | 3/1968  | Anderson.....        | 53/230   |
| 3,286,438 | 11/1966 | Sol.....             | 53/379   |

Primary Examiner—Roy Lake

Assistant Examiner—Neil Abrams

Attorney, Agent, or Firm—Markva & Smith

[57] ABSTRACT

An assembly for tucking and folding a wrapper extension section which projects outwardly from the edge along at least two contiguous sides of an article. The assembly includes a tucker blade means located along a path of travel for the article to form a tuck portion in the extension section along at least a first edge of the article. A straight edge section disposed on the tucker blade member is used to hold the tuck portion against the side of the article as it moves along the path. A first folder member located along the path is used to crease an overfold portion of the extension section along a second edge the article and over the tuck portion. The straight edge section is effective to prevent the tuck portion from changing position beneath the overfold portion. A straight edge section is disposed at a height along the path to be contiguous to the second edge of the article along which the overfold portion is being bent. An inclined edge acts to crease the overfold portion along the second edge of the article while the straight edge section performs its function. The assembly may be used in combination with any packaging machine to effect the desired results.

9 Claims, 13 Drawing Figures

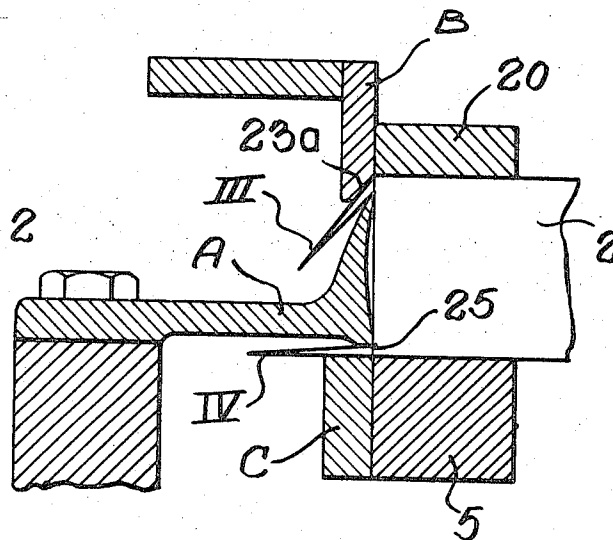


Fig. 1.

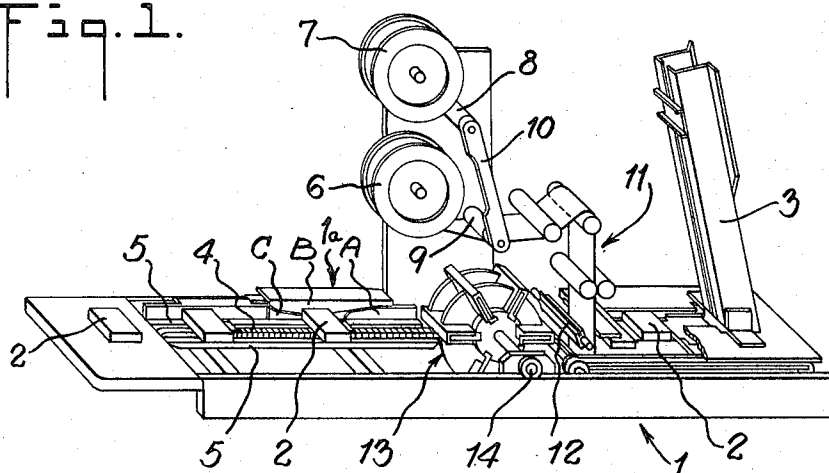
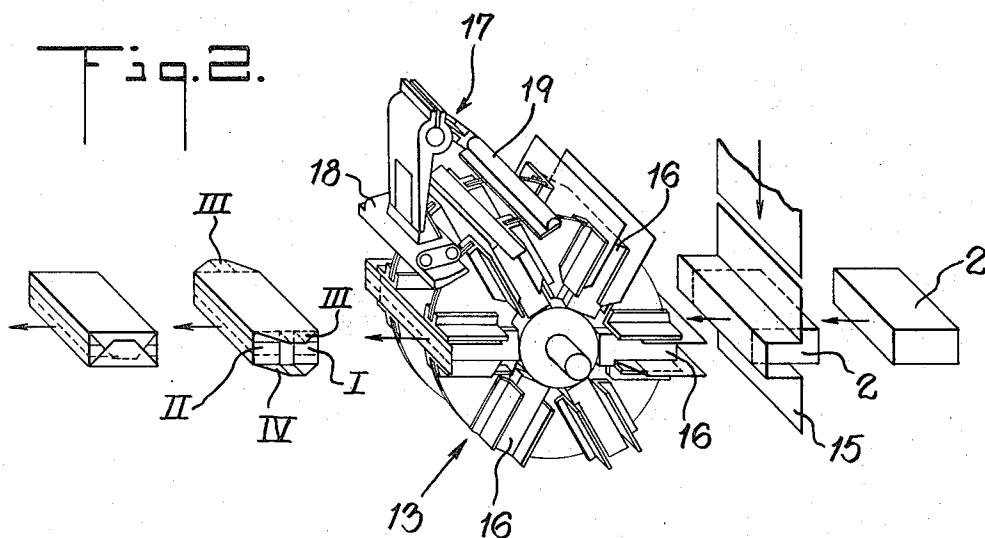


Fig. 2.



INVENTOR  
 ANDREW W. ANDERSON  
 BY *Lowry, Pinckert & Markwa*  
 ATTORNEYS

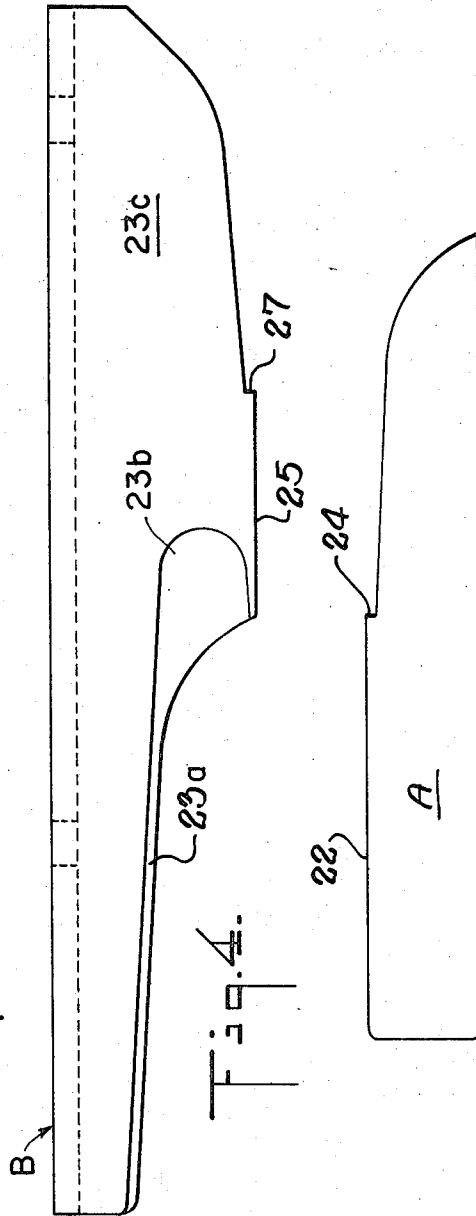
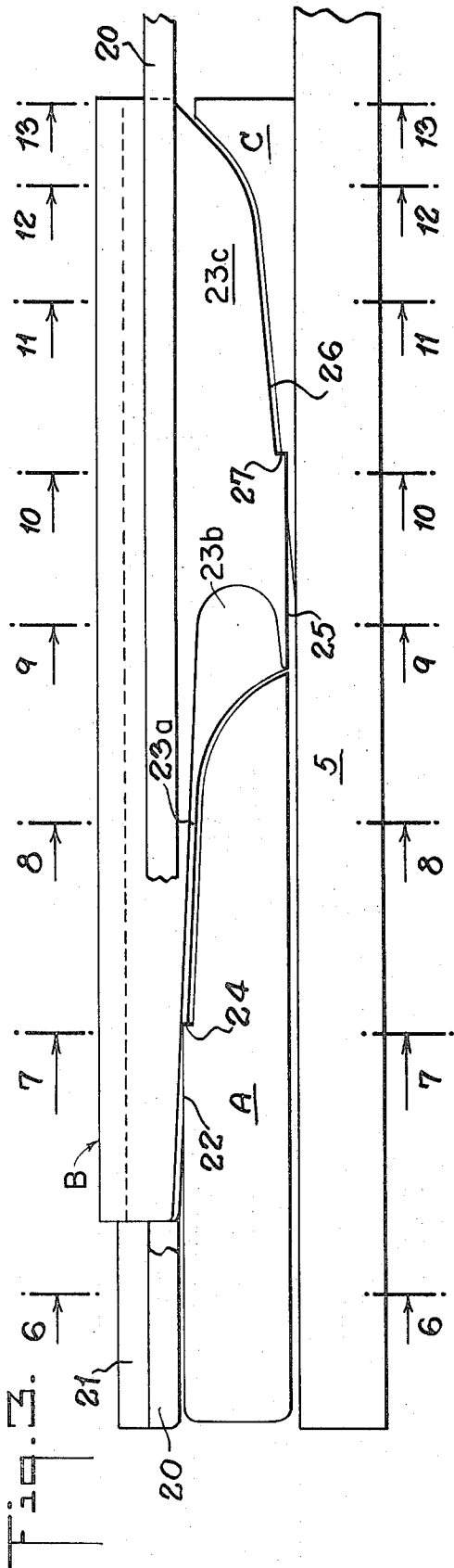


Fig. 5.

INVENTOR  
 BY ANDREW W. ANDERSON  
*Lowry, Reinhardt & Markwa*  
 ATTORNEYS



# APPARATUS FOR TUCKING AND FOLDING

## STATUS OF APPLICATION

This application is a continuation of applicant's application Ser. No. 858,370 filed Sept. 16, 1969, now abandoned.

## BACKGROUND OF THE INVENTION

The method and apparatus for folding and tucking portions of a package in a machine are generally known in the prior art. The U.S. Pat. No. 2,400,682 discloses a wrapper folding mechanism which incorporates a tucking and folding assembly for performing the general method of bending an overfold portion over a tuck portion. The wrapper folding mechanism incorporates a stationary tucker blade 130 and folder members which together form a planar wall structure including slots 131 and 132 which have a substantially uniform width and are located between the tucker blade 130 and said folder members. The end folds *a*, *b*, *c* and *d* as shown in FIGS. 5-8 of that patent are effected by the wrapper folding mechanism as follows: (1) The second end fold *b* is formed by the stationary tucker blade 130 disposed at the sides of the table used in the construction of the packaging machine. (2) The third end fold *c* as shown in FIG. 7 is passed through a slot 131 formed between a stationary block and the tucker blade 130 and thereby folded inwardly and downwardly. (3) The four end fold *d* as shown in FIG. 8 is passed through a slot 132 and thereby folded inwardly and upwardly. The slots 131 and 132 are formed in walls located at both sides of the supporting work table. The present invention constitutes an improvement in this prior art structure.

A more recent U.S. Pat. No. 3,286,438 discloses a mechanism and a packaging machine for closing the open ends of the wrapper applied around a box or other similar article. The patentee in this patent is concerned about the adjustability characteristics of a mechanism similar to that disclosed in the above described assembly of the prior art.

It is the general desire in the packaging industry to obtain a finished product having structural features which have both a pleasant and good appearance and at the same time have a highly effective, functional capacity. It has been found that in prior art assemblies such as described hereinabove, generally, symmetrical end wrapping configurations are not consistently produced. Therefore, the packages have an irregular appearance. In addition, it has been found that the tucked portions located beneath the overfold portions tend to bunch up or shift while the overfold portion is being bent over and pressed against the side of the article. Consequently, the generally non-symmetrical package is obtained and the functional use of the package is adversely affected. Functionally speaking, it is desirable to have a closed package so that the products inside the package will not be subjected to the atmosphere and thus dry out. This is of utmost importance in the cigarette industry wherein it is desired to have the tobacco products maintain their freshness over an extended period of time.

## PURPOSE OF THE INVENTION

It is the primary object of this invention to provide an apparatus for tucking and folding portions of a wrapper

extension which results in a tightly wrapped configuration.

It is another object of this invention to obtain a wrapped product having a symmetrical visual appearance thereby enhancing the attractiveness of the package.

A further object of the invention is to obtain a wrapped article that will ensure freshness of the packaged material over an extended period of time.

It is another object of this invention to provide an improved apparatus which performs the method of the invention in an effective and efficient manner while overcoming the basic disadvantages associated with prior art devices.

## SUMMARY OF THE INVENTION

The process for tucking and folding portions of a package in a machine includes the step of holding at least a first tuck portion against the side of the article while bending an overfold portion over the tuck portion. The tuck portion is held against the side of the article until a crease has been formed along the second edge of the article to prevent the tuck portion from changing positions beneath the overfold portion. It has been found that with prior art devices the shifting of the tuck portion takes place while the overfold portion is being creased along the second edge of the article. For this reason, the method of holding the tuck portion under the conditions as set forth hereinabove clearly provides a better wrapped product and overcomes disadvantages which are attendant the prior art methods and apparatus.

The assembly for tucking and folding a wrapper extension section includes holding means which press the tuck portion against the side of the article while folding means are provided to crease the overfold portion of the extension section along a second edge of the article. The specific holding means in a particular embodiment of this invention includes a straight edge section located on a stationary tucker blade means which wipes the tuck portion of the extension against the side of the article. The tuck portion holding means has an overlapping relationship with respect to the folding means. The straight edge section is disposed on the packaging machine to be contiguous to the second edge of the article beneath the overfold portion while the bending means acts to crease the overfold portion along the second edge of the article. In this manner, the second edge section prevents the tuck portion from changing position beneath the overfold portion. This assembly may be used in combination with any packaging machine which forms an extension section that projects outwardly from the edges of at least two contiguous sides of an article.

## BRIEF DESCRIPTION OF DRAWINGS

Other objects of this invention will appear in the following description and appended claims, reference being made to the accompanying drawings forming a part of the specification wherein like reference characters designate corresponding parts in the several views.

FIG. 1 is a perspective view of a prior art packaging machine incorporating an assembly made in accordance with this invention,

FIG. 2 is an exploded perspective view of selected portions of the prior art machine showing various wrapping stages effected in the process of this invention,

FIG. 3 is a side elevational view of an assembly for tucking and folding a wrapper extension in accordance with this invention,

FIG. 4 is a side elevational view of a top folder member used in an assembly made in accordance with this invention,

FIG. 5 is a side elevation view of a stationary tucker blade means in an assembly made in accordance with this invention,

FIGS. 6 through 13 are sectional views taken along the several lines 6-13 on FIG. 3 showing the various positions of an article and a wrapper when passing through the folding and tucking assembly made in accordance with this invention.

### DESCRIPTION OF SPECIFIC EMBODIMENTS

More specifically, a wrapping machine, generally designated 1, incorporates an assembly 1a to effect the folding of an extension section formed from a web of material 15 wrapped around the article 2. The articles 2 are loaded into the supply magazine 3. A conveying means such as a continuous chain 4 moves the articles 2 from the supply magazine 3 forwardly through the various stages of the wrapping machine 1. The article 2 moves along the support plate 5.

The sheet of wrapper material 15 is supplied from a primary supply roll 6. A reserve supply roll 7 is provided to insure rapid and continuous packaging of the articles 2 as they are forwarded through the machine 1. The web of wrapper material 15 passes over either of the idler rollers 8 or 9, depending upon which supply roll is being used. The idler rollers 8 and 9 are supported at either end of a support bar 10. A roller feed mechanism 11 draws the wrapper material 15 from the supply roll 6. A cutting device 12 separates the sheet of wrapping material 15 so that it may be wrapped around the article 2, as shown in FIG. 2.

The conveying chain 4 thrusts the article 2 into a pocket of the turret wheel 13. The tucker blades 16 located at the end of each of the pockets on the turret wheel 13 cause the wrapper extension to be folded inwardly toward each end of the article 2. The turret wheel 13 rotates on the support shaft 14 and the wrapper 15 is sealed along the longitudinal side of the article 2 by the folding mechanism, generally designated 17. A folding wiper blade 19 and a heat sealer 18 are used in cooperation with each other to form the seal along the longitudinal edge of the side of the article 2.

The wrapper feed mechanism 11, the operation of the conveying chain means 4, and the functioning of the turret wheel 13 in correlation with the folding mechanism 17 are all generally known in the prior art. Portions of the wrapping machine 1 have been eliminated from the FIG. 1 to satisfactorily show the interrelationship between the various working structural elements of the combination. Since the general relationship between and among the various sub-combinations of this wrapping machine 1 are generally known, as shown in U.S. Pat. No. 2,400,682, the detailed manner and operation of their mechanical structure is not deemed necessary to fully explain the invention of this disclosure.

The method of tucking and folding portions of a package as presented in this disclosure comprises the

following steps: (1) providing a wrapper having an extension section which projects outwardly from the edges of at least two contiguous sides of an article. (2) Thrusting at least a first tuck portion of the extension section inwardly to form a fold along a first edge of the article with the tuck portion being against a side intersecting said two contiguous sides. The tuck portion is placed beneath an overfold portion located along a second edge of the article. (3) Holding the tuck portion against said intersecting side of the article while bending the overfold portion of the extension section along the second edge of the article. (4) Maintaining the holding step until a crease has been formed along the second edge of the article to prevent the tuck portion from changing position beneath the overfold portion. (5) Pressing the overfold portion against the side of the article and over the tuck portion to form a snugly wrapped configuration.

Once the folding mechanism 17 has operated to seal the wrapper along one longitudinal side of the article 2, the extension section of the wrapper is formed on either end of the pocket, as shown in FIG. 2. As the partially wrapped article 2 moves from the turret wheel 13, it comes into contact with a stationary tucker blade A. This tucker blade A wipes across the end of the article 2 and forms the tucked portion II. The tucked portion I has been formed by tucker blades 16 when the web material 15 and article 2 have entered the pocket of the turret wheel 13. The tucked portion II is formed when the article 2 moves along the support plate 5. As shown in FIG. 3, the overfold portion III moves between the stationary tucker blade A and the top support plate 20. The overfold portion IV moves between the bottom support plate 5 and the tucker blade A. In this specific embodiment, a short top extension member 21 is shown over the initial tucking portion of the blade means A.

As the article 2 passes forwardly along the assembly of FIG. 3, the tucked portions I and II are held in place along the edge of the article 2 beneath the overfold portion III. Straight edge section 22 of the stationary blade means A is used to hold the tucked portions I and II in position until the partially wrapped article 2 passes the tuck release step 24. While the straight edge section 22 is pressing the tucked portions I and II against the side of the article 2, the folder member B is effecting the bending of the overfold portion III downwardly with the folding surface 23a. The overlapping relationship as shown in FIG. 3 between the straight edge section 22 and the folding surface 23a allows the overfold portion III to be folded downwardly and to be creased before the tucked portions are released along the edge of the article 2.

As is generally known in the prior art, the stationary tucker blade A is slightly concave in cross section to prevent the catching of any tucked portion beneath the overfold portions. That is, the structure will reduce drag on the tuck along the end of the article 2 being wrapped. In addition, the adhesive material used on the ends will not be wiped off by the concave shaped tucker blade means A. As indicated, this is a generally known characteristic of tucker blades used in the prior art and does not form a part of this invention.

As is evident from the drawings, folder member B includes an inclined folding surface 23a, a gradual pressing surface 23b and a final pressing surface 23c. Once the crease has been formed by folding surface 23a

along the second edge of the article 2, the overfold portion III is pressed against the end of the article 2 by the pressing surfaces 23b and 23c, as shown in FIG. 9. The length of the straight edge section 22 with respect to the inclined folding surface 23a is a function of the type of material being used in the packaging operation. It is also a function of the size of the packages that are involved. Once the basic relationship has been shown as disclosed herein, it is within the ordinary skill of the art to determine the various interrelationships which must exist between the various structural elements to obtain the optimum results necessary for the particular texture of material being used.

A further feature of this specific embodiment provides a second straight edge section 25 located along the bottom of the folder member B. The second straight edge section 25 holds the tucked portions I and II tightly beneath the lower overfold portion IV while the overfold portion IV is being bent upwardly and inwardly with respect to the end of the article 2. The holding of the tucked portions I and II against the side of the article 2 is maintained until the package passes the tuck release step 27 located on the top folder member B. The lower overfold portion IV is moved upwardly as the package 2 longitudinally moves along the second folder member C which includes an upwardly extending and inclined folding edge 26. The second straight edge section 25 and the inclined edge 26 of the lower folder member C have an overlapping relationship, as seen in FIGS. 3 and 10. This relationship enables the tucked portions I and II to be held against the side of the article 2 until the lower overfold portion IV has been creased.

As is evident in the drawings, the stationary tucker blade A and the first folder member B have planar surfaces disposed in a first plane which is parallel to the direction of movement of the article 2 past the assembly. The second straight edge section 25 is located on the first folder member B and is disposed in said first plane. As is further seen in the drawings, the inclined folding edge portion 26 is located in a second plane which intersects the first plane that includes the pressing surfaces of the stationary tucker blade A and the upper folder member B. That is, the inclined edge 26 begins at an offset location, as shown in FIG. 10, and gradually moves inwardly toward the side of the article 2 as well as causing the lower overfold portion IV to bend upwardly against the top folder member B. This is sequentially shown in FIGS. 10 through 13. This configuration prevents bunching of the wrapper material between the second straight edge section 25 and the inclined folding edge portion 26.

#### ADVANTAGES OF THE INVENTION

The process and assembly used to effect the process produce a wrapped package that has a symmetrical fold located along one side of the article 2. This symmetrical fold is especially important when transparent material, such as cellophane, is used as the wrapper material 15. In addition, the process and assembly of this invention insures a snugly wrapped configuration which will insure added protection of the contents of the article from the effects of the atmosphere. That is, the materials wrapped within the wrapper material 15 may be maintained in a fresh state over an extended period of time.

While the process and apparatus for tucking and folding has been shown and described in detail, it is obvious that this invention is not to be considered as being limited to the exact form disclosed, and that changes in detail and construction may be made therein within the scope of the invention, without departing from the spirit thereof.

I claim:

1. An assembly for tucking and folding a wrapper extension section which projects outwardly from the edges along at least two contiguous sides of an article which is moving along a path that extends in a direction perpendicular to the extension section, said article having a rectangular cross-section and the wrapper extension section having had a tubular configuration projecting outwardly from the four edges of the article, said assembly comprising:

- a. first stationary tucker blade means located along said path to wipe a tuck portion in the extension along a first edge of the article and against a side intersecting said two contiguous sides,
- b. second stationary means for holding the tuck portion against said intersecting side as the article moves along said path, and
- c. a first folder member located along said path for folding a first overfold portion of the extension section along a second edge of the article against said intersecting side,
- d. said first folder member having an inclined edge portion in spaced relationship to the stationary tucker blade means at a distance effective to receive the overfold portion of the extension section and cause the overfold portion to bend inwardly with respect to the article over the tuck portion,
- e. said second stationary means including a first straight edge section which is located on the stationary tucker blade means and is in overlapping relationship with respect to the first folder member whereby the tuck portion is held in place against said intersecting side,
- f. said first straight edge section being disposed contiguous to the second edge of the article to support the tuck portion beneath the first overfold portion at the crease line and to prevent the tuck portion from changing position therebeneath until said first folder member acts to crease the overfold portion along the second edge,
- g. a second straight edge section located on the first folder member and being disposed contiguous to a third edge of the article opposite the second edge thereof, and
- h. a second folder member having an inclined folding edge portion in spaced relationship to the second straight edge section at a distance to receive a second overfold portion of the extension section facing a first overfold portion thereof and to cause the second overfold portion to bend inwardly with respect to the article over the tuck portion held by said second straight edge section,
- i. said second straight edge section being in an overlapping relationship to the second folder member,
- j. said stationary tucker blade means and said first folder member having planar surfaces disposed in a first plane which is parallel to the direction of movement of said intersecting side of the article past the assembly, and

- k. said second straight edge section of said first folder member is disposed in said first plane and said inclined folding edge portion is disposed in a second plane that intersects said first plane to prevent bunching of the wrapper material between the second straight edge section and the inclined folding edge portion of said second folder member.
2. In a stationary tucking and folding mechanism including a tucker blade means and at least a first folder member forming a planar wall structure including a slot having a substantially uniform width and located between the tucker blade means and the folder member, said mechanism being mountable along a path traveled by an article having a wrapper extension section projecting outwardly from the edges thereof, said mechanism being effective to form a tuck portion in the extension section along a first edge of the article and then bend an overfold portion thereover as the article moves along the path, the combination comprising:
- a straight edge section located on the tucker blade means and in overlapping relationship with respect to the first folder member along said slot,
  - said slot having a configuration to receive the overfold portion of the extension section and cause the overfold portion to bend inwardly with respect to the article over the tuck portion,
  - said straight edge section being disposed at a height along said path to be contiguous to a second edge of the article to support the tuck portion beneath the overfold portion at the crease line to prevent the tuck portion from changing position therebeneath while the first folder member acts to crease the overfold portion along said second edge of an article.
3. In a mechanism as defined in claim 2 wherein a second folder member is disposed adjacent said first folder member to form another portion of the planar wall structure with a second slot having a substantially uniform width and located between the first folder member and the second folder member, said second slot having a configuration to receive a second overfold portion of the extension section and cause the second overfold portion to bend inwardly with respect to the article over the tuck portion and first overfold member, and a second straight edge section is located on the first folder member and in overlapping relationship with respect to the second folder member along said second slot, said second straight edge section being disposed at a height along said path to be contiguous to a third edge of the article to support the tuck portion beneath the second overfold portion at the crease line to prevent the tuck portion from changing position therebeneath while the second folder member acts to crease the second overfold portion along said third edge of the article.
4. In a mechanism as defined in claim 3 wherein said tucker blade means, first folder member and second folder member are disposed in order along said path whereby the functions thereof are performed sequentially.
5. In a mechanism as defined in claim 3 wherein the second folder member has an inclined edge portion in spaced relationship to the second straight edge section.

6. In a stationary tucking and folding mechanism including a tucker blade means and at least a first folder member forming a planar wall structure including a slot having a substantially uniform width and located between the tucker blade means and the folder member, said mechanism being mountable along a path traveled by an article having a wrapper extension section projecting outwardly from the edges thereof, said mechanism being effective to form a tuck portion in the extension section along a first edge of the article and then bend an overfold portion thereover as the article moves along the path, the combination comprising:
- a straight edge section located on the tucker blade means and in overlapping relationship with respect to the first folder member along said slot,
  - said slot having configuration to receive the overfold portion of the extension section and cause the overfold portion to bend inwardly with respect to the article over the tuck portion,
  - said straight edge section being disposed at a height along said path to be contiguous to a second edge of the article to support the tuck portion beneath the overfold portion at the crease line to prevent the tuck portion from changing position therebeneath while the first folder member acts to crease the overfold portion along said second edge of an article,
  - said stationary planar wall structure including a pressing means for holding the overfold portion against said intersecting side of the article and over the tuck portion to form a snugly wrapped configuration.
7. In a mechanism as defined in claim 6 wherein said pressing means includes a concave pressing surface and a planar final pressing surface, said concave and planar surfaces being stationary and forming a portion of said wall structure.
8. In a stationary tucking and folding mechanism including a tucker blade means and at least a first folder member forming a planar wall structure including a slot having a substantially uniform width and located between the tucker blade means and the folder member, said mechanism being mountable along a path traveled by an article having a wrapper extension section projecting outwardly from the edges thereof, said mechanism being effective to form a tucked portion and then bend an overfold portion thereover as the article moves along the path, said folder member including:
- a folding surface, a concave gradual pressing surface and a flat pressing surface,
  - said slot having a configuration to receive the overfold portion of the extension section and cause the overfold portion to bend inwardly with respect to the article over the tucked portion, and
  - said folding surface and gradual pressing surface being contiguous to said slot configuration.
9. In a stationary tucking and folding mechanism including a tucker blade means and at least a first folder member forming a wall structure having a slot located between the tucker blade means and the folder member, said mechanism being mountable along a path traveled by an article having a wrapper extension section projecting outwardly from the edges thereof, said mechanism being effective to form a tuck portion in the extension section along a first edge of the article and then bend an overfold portion thereover as the article moves along the path, the combination comprising:

- a. a straight edge section located on the tucker blade means and in overlapping relationship with respect to the first folder member,
- b. said slot having a configuration to receive the overfold portion of the extension section and cause the overfold portion to bend inwardly with respect to the article over the tuck portion,
- c. said straight edge section being disposed at a height along said path to be contiguous to a second edge of the article to support the tuck portion beneath the overfold portion at the crease line to prevent the tuck portion from changing position therebeneath while the first folder member acts to crease the overfold portion along said second edge of an article,
- d. a second folder member disposed adjacent said first folder member to form another portion of the wall structure with a second slot located between the first folder member and the second folder member,
- e. said second slot having a configuration to receive a second overfold portion of the extension section and cause the second overfold portion to bend inwardly with respect to the article over the tuck portion and first overfold member, and

- f. a second straight edge section located on the first folder member and in overlapping relationship with respect to the second folder member,
- g. said second straight edge section being disposed at a height along said path to be contiguous to a third edge of the article to support the tuck portion beneath the second overfold portion at the crease line to prevent the tuck portion from changing position therebeneath while the second folder member acts to crease the second overfold portion along said third edge of the article,
- h. said stationary tucker blade means and said first folder member having planar surfaces disposed in a first plane which is parallel to the movement of the intersecting side of the article past the assembly, and
- i. said second straight edge section of said first folder member is disposed in said first plane,
- j. said second folder member includes an inclined folding edge portion which is disposed in a second plane that intersects said first plane to prevent bunching of the wrapper material between the second straight edge section and the inclined folding edge portion of said second folder member.

\* \* \* \* \*

30

35

40

45

50

55

60

65