Sept. 12, 1967 H. R. CLOOTS 3,340,673

ARTICLE WRAPPING MACHINE

Filed June 17, 1963 2 Sheets-Sheet 1

Fig. 1

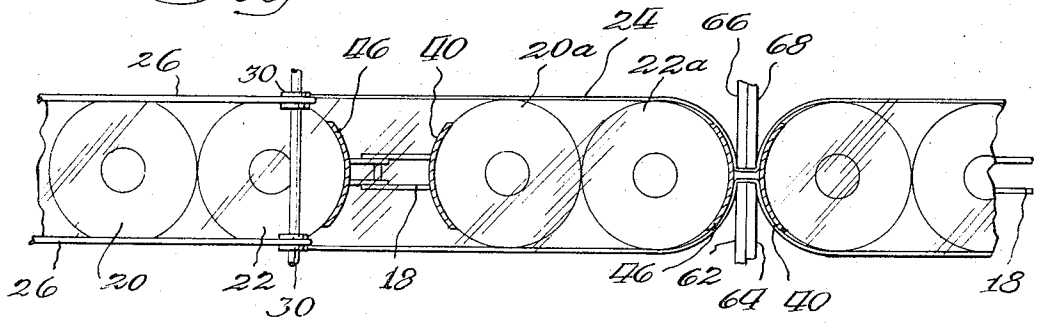


Fig. 2

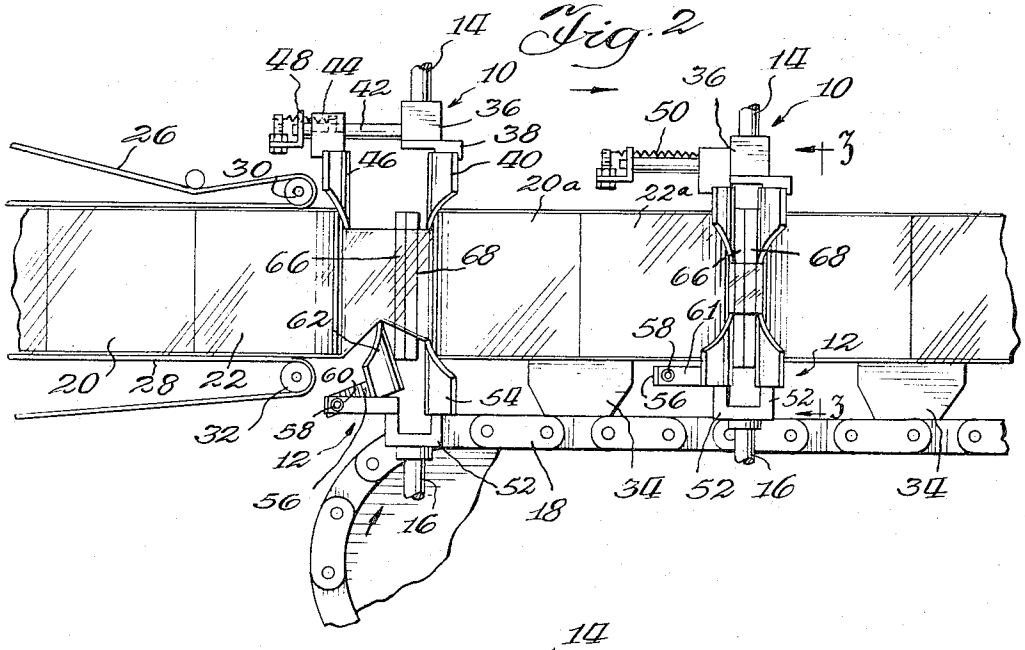
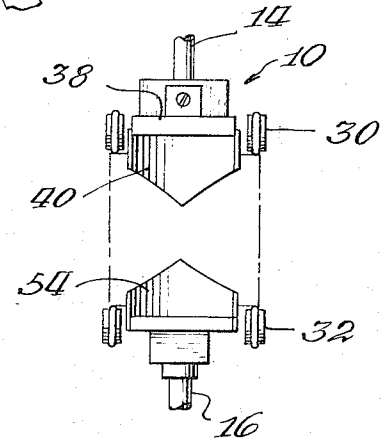


Fig. 3



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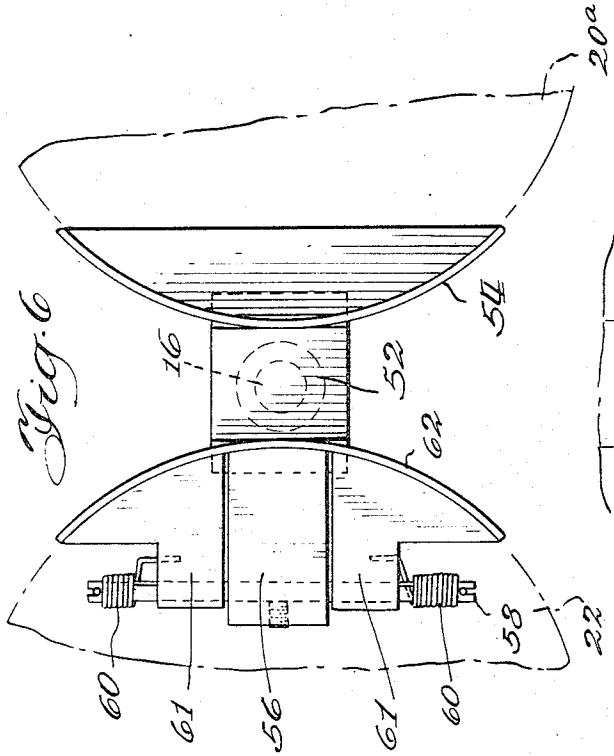


Fig. 6

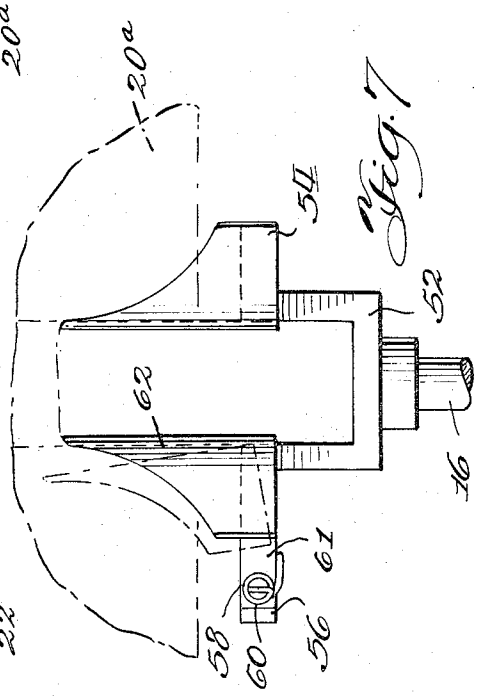


Fig. 7

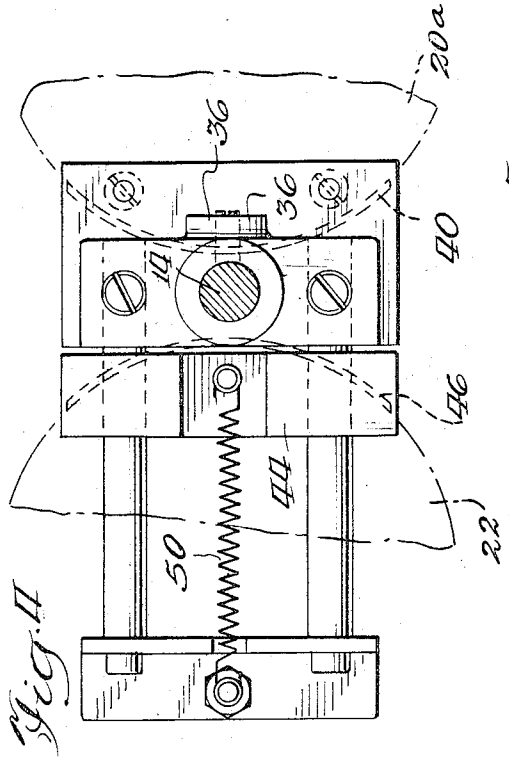


Fig. 11

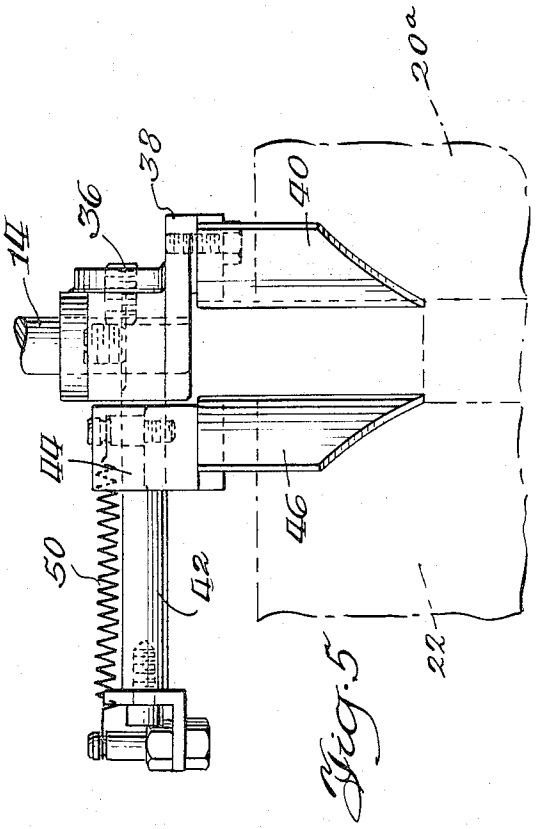


Fig. 5

United States Patent Office 3,340,673 Patented Sept. 12, 1967

3,340,673

ARTICLE WRAPPING MACHINE

Henry R. Cloots, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis., a corporation of Delaware

Filed June 17, 1963, Ser. No. 288,292
8 Claims. (Cl. 53—180)

This invention relates to improvements in article wrapping machines.

A primary object of the invention is to provide improved apparatus for forming neat gussets in film-like article enclosing wrappers.

A further object is to provide improved gusset forming equipment particularly adapted for incorporation in packaging equipment of the type in which spaced articles are first entubed in the sheetlike material and thereafter article bridging portions are drawn about opposite ends of the articles simultaneously with the formation of gussets to effect, when the wrapper is completed, a tailored appearance.

A further object is to provide improved gusset forming equipment which automatically adjusts gusset formers to compensate for variations in the size of articles being packaged.

Other objects and advantages will become apparent to persons skilled in the art by reference to the drawings and the description.

In the drawings, in which like parts are identified by the same reference numerals,

FIG. 1 is a plan view of apparatus incorporating the invention.

FIG. 2 illustrates in elevation the apparatus of FIG. 1.

FIG. 3 is an elevational view taken along lines 3—3, FIG. 2.

FIG. 4 is an enlarged plan view of an upper portion of the apparatus of FIGS. 1 and 2.

FIG. 5 is a fragmentary view in elevation of the device of FIG. 4.

FIG. 6 illustrates in plan the lower tucker mechanism shown in FIG. 2.

FIG. 7 shows in elevation the mechanism of FIG. 6.

The improved tucking device herein taught is particularly adapted for use with the type of wrapping mechanism disclosed in Henry R. Cloots, Robert G. Nutting, and Richard C. Wagner application, Ser. No. 288,290, now Patent No. 3,269,086, filed June 17, 1963, and in Robert G. Nutting and Richard C. Wagner application, Ser. No. 288,291, filed June 17, 1963, and which are owned by a common assignee. However, the mechanism may be employed with other types of packaging equipment. The invention is particularly directed to the solution of problems presented in respect to the proper formation of gussets formed in article bridging portions of entubed sheet material during formation of wrappers about articles which vary somewhat in size. The improved tucking or gusset forming device automatically compensates for variations in such articles, as for example, the diameter variations in rolls of toilet tissue.

As best shown in FIG. 2, the gusset forming device consists of two assemblies, i.e., an uper assembly generically designated **10**, and a lower assembly generically designated **12**. Assembly **10** is mounted by rod **14** to depend from a suitable conveyor or other portion of an associated wrapping machine which moves downstream in the arrow direction. Assembly **12** is supported by rod **16** which is attached to a member, not shown, extending between a pair of conveyor chains, one such chain being shown at **18**. FIG. 2 shows two pairs of tucker assemblies with the upstream pair in the initial stage of the gusseting operation and the downstream pair in the completed stage of that operation.

The packaging machine disclosed in said above mentioned co-pending application includes means for conveying articles to be wrapped in pairs, with mutually spaced pairs of toilet tissue rolls **20** and **22** being drawn downstream at a uniform rate of speed. Rolls **20**, **22** shown spaced from like pairs of rolls **20***a* and **22***a* and entubed in a film-like wrapper material **24** are drawn downstream while disposed in pressure engagement between a suitable upper conveyor belt **26** and a lower conveyor belt **28**. Said conveyor belts define a path the downstream end of which terminates as the belts move about guide pulleys **30** and **32**.

The assembly of spaced rolls or other generally cylindrical articles and the entubing film moves downstream of the path of conveyor belts **26**, **28** and onto a plurality of spaced supports **34** fixed to the above chain conveyor, one chain **18** thereof being shown. The chain conveyor, hence supports **34**, are driven in a downstream direction at a rate of movement somewhat less than the rate of movement of belts **26**, **28**, to effect the slackness in article bridging portions of film **22** required to permit end wrapping of said article bridging portions about the ends of each pair of articles concurrently with the formation of gussets as taught herein.

Upper tucker assembly **10**, depending, as above stated from rod **14**, is fixed to a suitable conveyor, not shown, and synchronized with the speed of the lower chain conveyor as illustrated by chain **18**. As the upper conveyor moves rod **14** and attached assembly **10** in a downstream direction, the rod **14** is cam controlled to move downwardly from the position shown at the left in FIG. 2 to the position shown at the right therein. Simultaneously with the cam controlled lowering of tucker assembly **10**, the lower tucker assembly **12** is moved by conveyor chain **18** and the conveyor mechanism associated therewith into the position shown to the right of FIG. 2. Rod **16**, to which assembly **12** is fixed, is also cam controlled, in a manner not shown, but taught in said co-pending application simultaneously to move assembly **12** upward during travel thereof to the right hand position, FIG. 2.

Assembly **10**, as shown in FIGS. 2, 4 and 5, consists of a bracket-like structure **36** which includes an offset arm **38** from which depends an arcuate tucker blade **40**. A pair of spaced guide rods **42** extend horizontally from bracket **36**, bearing members **44** being slidably mounted on rods **42**. Tucker blade **46**, identical with blade **40**, is fixed to depend from member **44**. The path of member **44** is limited in a direction outwardly of bearing **36** by a bracket-like stop member **48** which also provides mounting support for tension spring **50**, the opposite end of which is fixed to slide member **44** to bias that member, hence blade **46**, toward bracket **48**. Tucker blades **40**, **46** are of shield-like configuration, being uniformly arced in a horizontal plane as shown and with the lower end portions thereof arcuately converging to a point as best shown in FIG. 3. The degree of arc of blades **40**, **46** is that of the peripheral surfaces of the cylindrical article undergoing packaging, hence they fit snugly against such articles when fully engaged therewith. Tucker assembly **10**, as shown to the right of FIG. 2, has moved into a position of partial engagement with the article. Tucker assembly **10** is drawn clear of the path of movement of the article assembly after the completion of the gusseting operation as shown to the right in FIG. 2 and remains in that withdrawn position until it is cammed downwardly when moving into a right hand position, illustrating an early stage of gusset formation.

As shown in FIG. 2 the lower tucker assemblies supported on rods 16 comprises a U-shaped bracket 52, the forward arm of which supports an arcuate tucker blade 54. The trailing arm of bracket 52 carries an extension 56 to which is pivoted at 58 an arm 60 to which is mounted the trailing tucker blade 62. As shown in FIGS. 6 and 7, pivot 58 comprises a pintle carrying associated helical biasing springs 60 to urge blade 62 toward the dotted line position, FIG. 7. As lower conveyor chains 18 move the lower tucker assemblies into the path of article travel as shown in FIG. 2, lower tucker blades 62 contact the article bridging film portions while urged upwardly about pintle to raise the film and automatically compensate for the slack resulting from the speed differential of the two conveyors at that time. As the article assembly moves downstream the lower tucker assemblies are cammed into the positions shown to the right, FIG. 2 and the trailing lower tucker blade 62 returns to the vertical position shown. Thus, the lower tucker blade assembly is synchronously actuated with the upper blade assemblies as each pair of registered assemblies move downstream to effect symmetrical gussets from both above and below the article assembly.

Two pairs of pressure and sealing bars, forming no part of the present invention but fully disclosed in said copending applications simultaneously move from positions laterally of the path of article travel to positions within the path. Said paired bars, including pressure bars 62, 64 and heat sealing bars 66, 68, move with substantial medial abutment with the film therebetween, FIG. 1, upon completion of the gusseting operation, and then are cammed apart, not shown, and drawn into full abutment at which time the sealing elements carried thereby are pulsed to effect a heat seal and severance of the film. It is important that each pair of tucker assemblies remain in the position shown to the right, FIG. 2, while the bars are separated, since a better package results than if withdrawn at an earlier stage. All structure referred to herein but not shown since not a part of this invention is fully shown and disclosed in said copending applications.

I claim:

1. In a device of the character described, means for conveying wrapper enclosed and entubed articles in a downstream direction, and means for forming gussets in said wrapping material adjacent the ends of said articles, said last mentioned means comprising a pair of spaced gusset formers driven downstream at the speed of said entubed articles, one of said spaced gusset formers being slidably mounted in respect to the other in the direction of downstream movement and maintained biased in an upstream direction.

2. In a device of the character described, means for conveying wrapper enclosed and entubed articles in a downstream direction and means for forming gussets in said wrapper material adjacent the ends of said articles, said last mentioned means including a pair of spaced gusset formers driven downstream at the speed of said entubed articles, one of said spaced gusset formers being movably mounted to move from an initial position toward the other and being maintained biased in its initial position.

3. In a device of the character described, means for conveying wrapper enclosed and entubed articles in a downstream direction and means for forming gussets in said wrapper material adjacent the ends of said articles, said last mentioned means including two pairs of spaced gusset formers driven downstream at the speed of said entubed articles and the pairs disposed on opposite sides of the tube enclosing the articles, one of the gusset formers of each pair being movably mounted to move from an initial position toward the other and maintained spring biased in its initial position.

4. In a device of the character described as set forth in claim 3, one of said spaced gusset formers of one of said pairs being slidably mounted with respect to the other gusset former of the pair and one gusset former of the second pair being pivotally mounted with respect to the other gusset former of the second pair.

5. In a device for enclosing articles having substantially cylindrical end surfaces, means for conveying the articles in a downstream path in wrapper enclosed and entubed condition, and means for forming gussets in said wrapping material about the cylindrical ends of said articles, said last mentioned means comprising a pair of shield-like cylindrical gusset formers adapted to fit around the cylindrical ends of the articles and means for moving said gusset formers into said path and between the articles with the longitudinal centers of the cylindrical surfaces of said gusset formers and of said end surfaces of said articles extending in the same direction so as to form the gussets about the cylindrical end surfaces of the articles.

6. In a device for enclosing articles having substantially cylindrical end surfaces, means for conveying the articles in a downstream path in wrapper enclosed and entubed condition, and means for forming gussets in said wrapping material about the cyindrical ends of said articles, said last mentioned means comprising a pair of shield-like cylindrical gusset formers adapted to fit around the cylindrical ends of the articles and means for moving said gusset formers into said path and between the articles so as to form the gussets about the cylindrical end surfaces of the articles, said gusset forming means including also a second pair of shield-like cylindrical gusset formers and means for moving said last named gusset formers into said path from an opposite direction from that in which said first named gusset formers are moved into said path, and means for movably mounting one gusset former of each of said pairs to move in the downstream direction with respect to the other gusset former of the pair, and means for maintaining the movable gusset former of each pair biased in the upstream direction with respect to other gusset former of the pair.

7. In a device for enclosing articles having substantially cylindrical end surfaces, means for conveying the articles in a downstream path in wrapper enclosed and entubed condition, and means for forming gussets in said wrapping material about the cylindrical ends of said articles, said last mentioned means comprising a pair of shield-like cylindrical gusset formers adapted to fit around the cylindrical ends of the articles and means for moving said gusset formers into said path and between the articles so as to form the gussets about the cylindrical end surfaces of the articles, said conveying means including an initial relatively high speed conveyor and a subsequent relatively low speed conveyor so as to provide slack in the wrapper between said articles, said gusset forming means including a second pair of shield-like cylindrical gusset formers, and means for moving said second pair of gusset formers into said path and between the articles from an opposite direction from that in which said first named gusset formers are moved and both pairs of said gusset formers being moved between said articles on said low speed conveyor so that the gusset formers utilize the slack in the wrapper for forming the gussets.

8. In a device for enclosing articles as set forth in claim 7, said wrapper being of heat sealable film, one gusset former of each of said pairs being movable with respect to the other gusset former of the pair in the direction of downstream movement, means for maintaining the movable gusset former of each pair spring biased in an initial position and movable toward the other gusset former of the pair to a final position with the gusset formers still being spaced in said final positions, and heated pressure bars movable between said gusset formers in the final positions of said movable gusset formers and traveling along with said low speed conveyor for

sealing the wrapper about the gussets formed by the gusset formers.

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